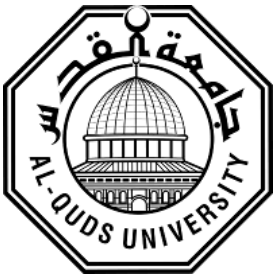
Deanship of Graduate Studies

Al-Quds University



Compliance of Dental Health Care Providers with The Infection Prevention and Control Protocol in Gaza Strip

Amjad Ghassan El-Rayyes

MPH Thesis

Jerusalem-Palestine

1439/2017

Compliance of Dental Health Care Providers with The Infection Prevention and Control Protocol in Gaza Strip

Prepared BY

Amjad Ghassan El-Rayyes

B.D.S. , Baghdad University, College of Dentistry, Iraq

Supervisor: Dr. Lamis Abuhaloob, PhD.

Consultant in Dental Public Health - Ministry of Health

State of Palestine

Thesis Submitted in Partial Fulfillment of Requirements for the Master Degree of Public Health/ Epidemiology Al-Quds University

1439/2017

Al-Quds University
Deanship of Graduate Studies
School of Public Health

Thesis Approval

Compliance of Dental Health Care Providers with The Infection Prevention and Control Protocol in Gaza Strip

Prepared By: Amjad G. EL-Rayyes
Registration No. :21411288

Supervisor: Dr. Lamis Abu Haloob

Master thesis submitted and accepted. Date / / 2017
The names and signatures of the examining committee members are as follow:

1. Head of committee: Dr. Lamis Abu Haloob Signature.....
2. Internal examiner: Dr. Yehia Abed Signature.....
3. External examiner: Dr. Ashraf El-Jedi Signature.....

Jerusalem-Palestine

1439/2017

Dedication

I would like to dedicate this work to all my family: the soul of my loving mother (RIP) whom I earned the loving of knowledge and learning, father Ghassan whom I'm proud of being his son , brother Salim, sister Dr. Dalia, wife Heba, lovely sons Qusai, Awsam, lovely daughter Dalia, lovely nephews, lovely nieces, to all my friends.

To everyone encouraged me, supported me and believed in me, to all persons who participated in making me having the master degree and make this research succeed.

Amjad Ghassan El-Rayyes

Declaration

I certify that this thesis submitted for the degree of master is the result of my own research, except where otherwise acknowledged, and this thesis or any of its parts has not been submitted for a higher degree to any other university or institution.

Signature

Amjad Ghassan El-Rayyes

Date :____/____/_____

Acknowledgment

I would like to express my sincere thanks and gratitude to all those whom without their participations, this research would never been achieved. I am deeply appreciative for those who helped me to make this work possible. The teaching staff at the school of Public health, Al-Quds University, for their efforts through the study period especially Dr.Yehia Abed, Dr. Bassam Abu Hamad and Dr. Khetam Abu Hamad. Big thanks to the university administrative team.

I would like to thank *Dr. Lamis Abu Haloob* my supervisor who was involved in all the steps of the research, was so patient with me and gave me generous information and knowledge. She was a good supervisor and a perfect assistant in my study, thanks for her help and her contribution in the research in general. Also, my deep thanks expand to all those who provided helpful suggestions and useful recommendation during the study and the preparation of the questionnaire, checklists, especially Mr.Kamel Al-asmar, Dr.Amal Al-Batsh who were helpful in the period of validation for the questionnaire and the checklist.

My deep thanks go to all senior medical officers at the MOH and the UNRWA health centers, all my colleagues as I'm a dental surgeon working in the Primary Health Care centers in the Ministry of Health, all the dental health care providers who gave me time, efforts, and support to facilitate the research study to be completed.

I will never forget my mother, may her soul rest in peace, who was my first teacher ,and her blessings are lightening up my journey of life.

I will never forget my family who supported and encouraged me all over the period of study. My father , wife, brother , sister and my sweet sons and daughter especially my son Qusai who was asking me about my study.

Yours faithfully,

Amjad El-Rayyes

Abstract

Palestinian Ministry of Health (M.O.H.) has adopted the Palestinian Infection Prevention and Control (IPC) protocol in 2004, in order to control the infection among the health care providers (HCPs), clients, community and environment. The compliance of the HCPs in the field of dentistry is an important issue for controlling the cross infection and was not assessed completely. Thus a cross sectional observation analytic epidemiological investigating study was conducted to investigate the compliance of the dental health care providers (DHCPs), in primary health care (PHC) clinics in the Palestinian (M.O.H.) and the United Nation Relief and Working Agency of Palestinian Refugees (UNRWA) in Gaza Strip, with the standards of the (IPC) protocol.

As well as to compare the compliance with IPC protocol between the M.O.H. and the AUNRWA's DHCPs, and to investigate any factors may affect the compliance of DHCP in the provision of health services in the PHC dental clinics according to the Palestinian IPC protocol, which will reduce the incidence of infectious diseases and deaths.

The data were collected through a self-administered questionnaire distributed to 137 permanent DHCPs employees in PHC centers in the M.O.H. and UNRWA. The researcher conducted observation and completed checklist of practice 3 times for each DHCP. While providing primary dental health care (PDHC) services for the patients and by using additional checklist of environment for each dental clinic and for the Systems and Supplies.

The study showed that 59.9% of the participants were males and 40.1% were females. Most of participants graduated from universities in Palestinian and Arabic countries, 97.8% vaccinated with hepatitis B, 29.1% had a copy of the IPC protocol. The study showed that 21.2% of the participants said that they have a monitoring system of the infection rate in the clinic, 47.4% of the participants said that the reason for the shortage of materials is that they are not available in the medical central stores, they are face masks, bleaching agent, towel papers for dental chair. Around, 78.3% of the DHCPs did not wash their hands, meanwhile, 99.3% of them wore disposable gloves and changed them, 96.4% disinfected the instruments after use with a suitable disinfectant solutions as as the cidex for the M.O.H. and for the UNRWA the chlorine 0.5% is more preferable with a suitable brush. Among DHCPs, 98.5% defined the IPC protocol, 75.9% showed proper knowledge for the importance of IPC standards for society, 83.9% suggested that the IPC protocol needs modification, 45.3% wore the face mask, and 100% the DHCPs confirmed that there is no protocol for medical accidents such as needle stick injury. The inferential statistics showed statistically significance differences in the compliance with IPC protocol between the PHC services in the M.O.H. and UNRWA. The mean compliance was 95.42 in UNRWA. The study concluded that there are many positive features to support the DHCPs' compliance with the IPC protocol, such as the use of hot steam sterilizer, the sharp box (safety box) and the wearing of gloves by the DHCPs during their practice, but still there are some aspects needs to be strengthened.

List of Contents

List of Tables

List of Figures

List of Annexes

List of abbreviations

CDC	Center of Disease Control
DHCP	Dental Health Care Provider
DHCPs	Dental Health Care Providers
DK	Don't Know
G.G.	Gaza Governorates
HCPs	Health Care Providers
HIV	Human Immunodeficiency Virus
IPC Protocol	Infection Prevention Control Protocol
M.O.H.	Ministry Of Health
NGOs	Non-Governmental Organizations
No.	Number
PDHC	Primary Dental Health Care
PHC	Primary Health Care
PPE	Personal protective equipment
SPSS	Statistical Package of Social Sciences
UNRWA	United Nation Relief and Working Agency for Palestinian Refugees
WHO	World Health Organization

Chapter 1. Introduction

1.1 Introduction

The cross infection occurs as a result of the usage of unsterilized medical equipments, the direct contact with an infected person through skin or biological fluids, touching contaminated objects, or viruses inhalation through the respiratory tract (Cherney, 2013).

The International Federation of Red Cross and Red Crescent Societies (2001) have considered the dental clinics as one of the major places of cross infection. Many studies have demonstrated that the transmission of infectious diseases by needles stick injuries, splashes of blood, saliva, or other body secretions of patient, makes dental clinics one of the most risky places for contamination (Gupta, 2011; Morris et al., 1996; Wood 1992; Martin, 1990). Thus, most people are afraid or suspicious of the dentists' practices (Schiff et al., 1986).

Moreover, patients have fairs of being exposed to the infection as a result of the usage of unsterilized instrument s or receiving treatment in contaminated environment (Center for Disease Control and Prevention, 2003; Kohn et al, 2003) and being exposed to infections (e.g. AIDS and Hepatitis) (Schiff et al, 1986). In the same time, the dentists are worried of being having viruses of AIDS or Hepatitis from infected patients who unaware or refused to inform that they have infectious diseases (Al-Omari and Al-Dwairi, 2005; Puro et. al., 2003; Martin,1990; Klein et. al., 1988).

Discovery of new infectious disease (e.g. HIV) and havening a good understanding of treatment regimes, transmission and prevention of these diseases raised the importance of practicing infection prevention and control in oral health care settings (Kuhar et. al., 2013)

There are several methods to minimize cross infection. These methods include vaccinations, antibiotics, anti-viral and anti-fungal medications, routine use of barrier techniques (gloves and masks), decontamination and sterilization of dental environment and instruments (Cherney, 2013; Molinari and Harte, Cottone’s 2010; Al-Rabeah, 2002).

Literature review stated that risks of cross infection increases with high prevalence of infectious diseases and existence of factors retard the adequate implementation of cross infection control in dental care practices (Cherney, 2013; Kuhar et. al., 2013; Molinari and Harte, 2010).

As a response for growing focus on practicing infection prevention and control globally and in Palestine, the Palestinian M.O.H. published the IPC protocol in 2004. This protocol is general and contains procedures for cross infection control following universal precaution standards (Ministry of Health, 2004).

1.2 Research problem

The dentists working in the Palestinian M.O.H and UNRWA are exposed to communicable diseases from infected patients attending the PHC dental clinics. High rates of infectious diseases in Gaza Strip and increased risks of low compliance with the application of IPC Protocol in M.O.H. and UNRWA could allow the transmitting of infections from person to person during daily dental practice and treatments.

The continuous political conflicts and wars in the Gaza Strip caused gradual deterioration in the availability of M.O.H's material and resources and negatively affected the secure of good quality of dental material, well established maintenance services, training workshops and getting a high quality practice and acceptable standard of dental treatment.

Ensuring high compliance and implementation of IPC Protocol in M.O.H. and UNRWA in the Gaza Strip is seriously essential to reduce the morbidity and mortality due to cross infection. As infection is still one of the ten leading cause of death around the world (Center of Disease Control, 2003)

1.3 Justification of the study

The cross infection prevention protocols raise the importance that all dentists working in the Palestinian M.O.H and UNRWA are required to consider that all patients attending the PHC dental clinics are infected with blood borne diseases and deal with them as that, with the care of that patients attending the dental clinics may also get infection of blood borne pathogens by contaminated instruments or by direct contact with health team. (Abichandani, 2013).

Previous studies illustrated that there are fairs of ignoring the IPC protocol by health workers, despite of their high educational and training level (McCarthy et al., 1999). Thus, the IPC Protocol in the Palestinian M.O.H. (2004) creates safe environment to protect the health workers, clients, the community and the environment to enhance the positive

attitude and practice in the dental field. These protections are gained through the application of the infection prevention procedures by the HCPs.

Unavailability of information confirm the DHCP's compliance in M.O.H. (just a simple and limited study by self-administered questionnaire with no observation check list of practice or the system and supplies was done by Al-kishawi, N., 2013 on Al-Remal Martyr Clinic) and old information confirming the DHCP's compliance in the UNRWA dental clinics with these instructions (Abu Zaid T., 2010 study), raises the fairs of low control on cross infection and high risk of exposing both of DHCPs and patients to infection during providing or receiving dental treatments, In addition, this issue raises the importance of investigating the compliance with IPC Protocol, assessing the present process and procedures which are using to practise IPC Protocol instructions by DHCPs in dental care clinics in M.O.H. and UNRWA and investigating risk factors that influence the compliance with the IPC Protocol instructions.

Based on that the objective of the proposed study is to assess the compliance of dental health care providers with IPC protocol in the dental clinics of PHC Centers in M.O.H. and UNRWA in the Gaza Strip - Palestine.

1.4 Objective, questions, hypothesis and operational definitions

1.4.1 General objective

To assess the compliance of DHCPs with IPC protocol in the dental clinics of PHC Centers in M.O.H. and UNRWA in the Gaza Strip - Palestine.

1.4.2 Specific objectives

- To compare the IPC practice in dental units with the instruction of national IPC protocol.
- To assess the variation in IPC protocol practice according to demographic and organizational variables.
- To investigate factors influence the compliance of DHCPs with the IPC protocol in the dental clinics of PHC Centers.

- To compare between the IPC protocol compliance among the DHCPs who are working in the P.H.C. in the M.O.H. and the those who are working in the UNRWA.

- To assess the importance of practicing IPC protocol and the implementation of the protocol.

- To explore the infrastructure of the dental units and it's capability to fit the IPC protocol standards.

- To build up the recommendations that assist Palestinian M.O.H. and UNRWA to improve the dental care providers' compliance to the IPC protocol.

1.5 Research questions

1. What are the protective measures that the DHCPs apply in the dental clinics at the PHC in M.O.H. and UNRWA ?
2. How do the dentists protect themselves from the cross infections such as Hepatitis B, HIV, Herpes simplex virus and influenza virus in dental care setting in M.O.H. and UNRWA?
3. Are there differences between Dental clinics regarding the IPC protocol practice?
4. What are the factors causing variations in the DHCPs compliance with the Palestinian IPC protocol?
5. Does training of the DHCPs have positive impact on the implementation of the IPC protocol ?
6. What do the DHCPs do with the dental waste? How do they deal with it ?
7. What are the restrictions that inhibit the DHCPs from improving IPC protocol practices?
8. How can we motivate the DHCPs to implement the Palestinian IPC protocol?

1.6 Operational definitions

Sterilization: it's the process which kills all microorganisms including virus, bacteria, fungi, protozoa, endospores and eliminates them from the sterilized instrument or devices. This is done by various ways and devices such as heat sterilizations by: dry heat sterilizers and autoclaves or by chemical sterilization (cold sterilization) (Centers of Disease Control, 2003).

Disinfectant: is a chemical agent used on inanimate objects (e.g., floors, walls, or sinks) which destroys all recognized pathogenic microorganisms but not all the microbial forms (bacterial endospores) (Centers of Disease Control, 2003).

Dental units: are all dental clinics either fixed or mobile ones which provide dental services.

Dental Health Care Provider (DHCP): it refers to all persons either directly involved in patients care such as dentists, dental hygienists, dental assistants, nurses, students, trainees, and interns or indirectly involved in the patients care but potentially exposed to infectious agents such as administrative, clerics, maintenance worker, cleaner and volunteer personnel) (Centers of Disease Control, 2003).

Compliance: following the instructions, guidelines recommended by the Palestinian IPC protocols.

Infection prevention and control (IPC) practices: are the procedure and practices carried by the DHCP such as hand washing, using protective barrier to reduce and restrict the spread of infection in the clinics from patient to patient, from patient to DHCP, or from DHCP to patient (Centers of Disease Control, 2003).

Palestinian IPC Protocol:

Is a protocol produced by the Palestinian M.O.H. by direct contribution and participation of Palestinian professional experts working in the M.O.H. and Mararm foundation in November 2004 (Palestinain Ministry of Health, 2004) for prevention of cross infection, through protection of health workers, clients, the community and the environment by carrying out an infection prevention procedures within a strategy of standard precautions.

Personal Protective equipment (PPE): are special clothing or equipment worn by the DHCP (gloves, eye goggles, facemasks, face shield, apron, gowns) and used to protect the DHCP from infectious blood borne pathogens or saliva and other biological fluids (Centers of Disease Control, 2003).

1.7 Context of the study

1.7.1 Geographic and demographic context

Gaza Strip is a narrow piece of land located on the eastern coast of the Mediterranean sea between Egypt and Israel , around 40 km coast line, it's 45 km long, and 6-12 km wide

with 365 square kilometer land area (statistics, 2016). Gaza Strip is at the major flat and sandy .Gaza Strip was occupied by Ottomans and British mandate. Gaza port was one of the most active ports in the region during that period of time, and lastly Gaza became under the Israeli occupation. After the war 1948 which locally known as NAKBA, Gaza Strip became under the Egyptian administration control. In the present time Gaza Strip and the west bank is under the control of the Palestinian Authority according to Oslo agreement in September 1993 (Wikimedia Foundation, 2016).

The population of Gaza Strip is about 1,881,135 with a population density 5153.79 individuals/km^2 in Gaza Strip. (Palestinian Center Bureau of Statistics, 2016) (statistics, 2016). Gaza Strip composed of five governorates: the North, Gaza City, the Mid zone, Khan-Younis and Rafah (Wikimedia Foundation, 2016).

1.7.2 Socioeconomic political context

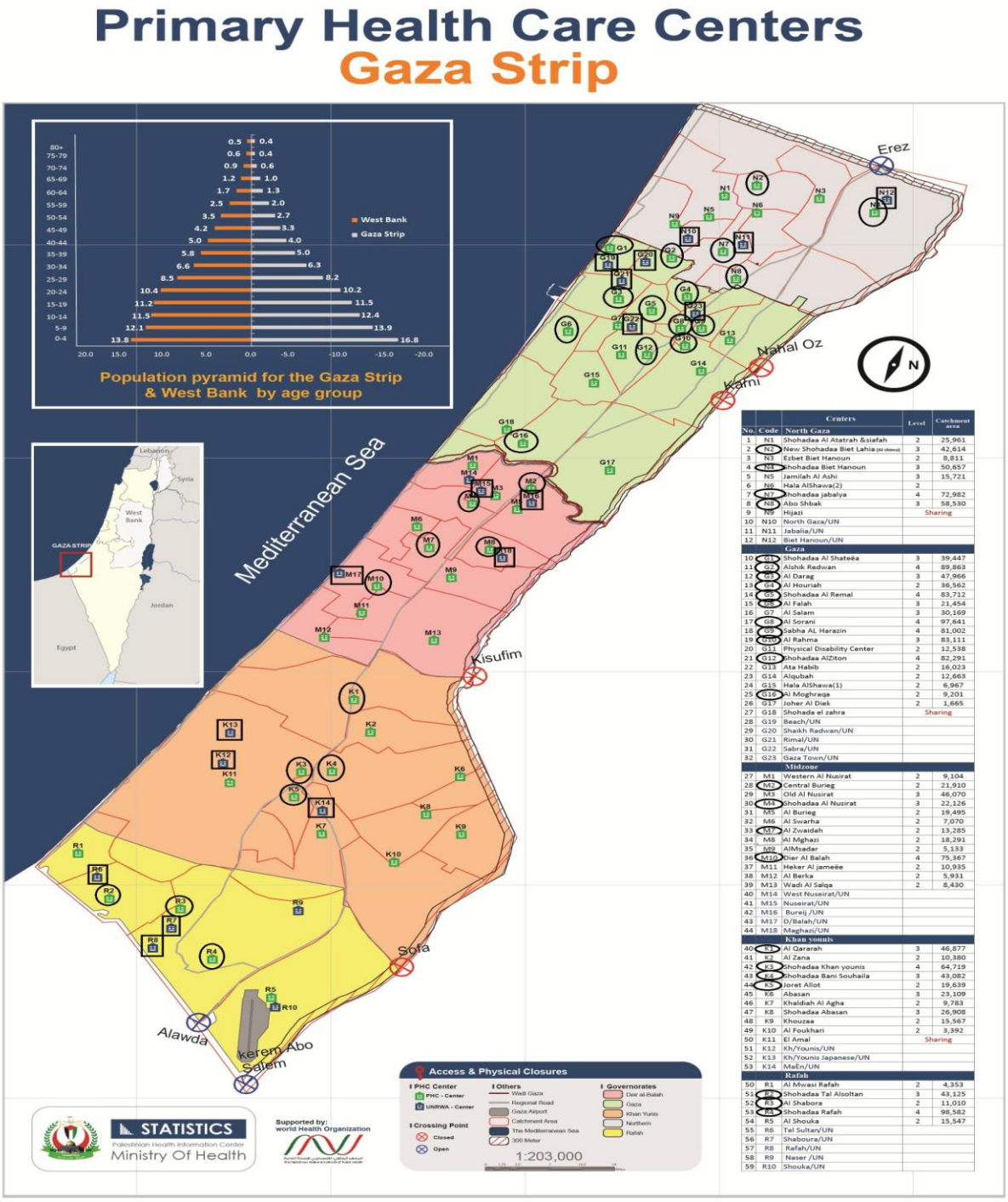
The narrow piece of land named Gaza strip is full of people with a very high density of population (statistics, 2016). The main source of income nowadays depends on salary payment for the employed working people and the donation coupons for the major part of the population, the percentage of poverty in Gaza Strip is 38.8 %, (Palestinian Central Bureau of Statistics, 2013). In addition, a part of income comes from the trade with the west bank and the rest of the world via Karem Abu Salem Crossing. The Palestinian income indicator is getting down as there are no open borders with the rest of the world. The percentage of unemployed people in the Gaza Strip is 53.1 % (above the age of 15 years old) (Palestinian Central Bureau of Statistics, 2013). All this and the Gaza Strip is under an Israeli Blockade and trading siege.

1.7.3 Dental Health Services in Primary Health Care Sector

The Palestinian Primary Health Care Sector composed of two major foundations, they are the M.O.H. and the UNRWA, which offer PHC services for the Palestinian population in Gaza Strip, through 77 PHC clinics distributed along Gaza Strip.

They are 56 PHC clinics run by the M.O.H. and 21 PHC clinics run by the UNRWA. (Palestinian Ministry Of Health, 2016, UNRWA, 2016). There are 27 dental clinics in PHC in M.O.H. and 19 dental clinics in UNRWA in Gaza Strip, they offer basic oral health care services in dental clinics (consultation, fillings, scaling and extraction) (M,O.H., 2016; UNRWA, 2016) (Figure No. 1).

Figure 1: Map shows distribution of Primary Health Care centers of the M.O.H and UNRWA in the five Gaza Strip Governorates .



No.	Code	Centers	Level	Catchment area
		North Gaza		
1	N1	Shohadaa Al Atatrah &siafah	2	25,961
2	N2	New Shohadaa Biet Lahia	3	42,614
3	N3	Ezbet Biet Hanoun	2	8,811
4	N4	Shohadaa Biet Hanoun	3	50,657
5	N5	Jamilah Al Ashi	3	15,721
6	N6	Hala AlShawa(2)	2	
7	N7	Shohadaa jabalya	4	72,982
8	N8	Abo Shbak	3	58,530
9	N9	Hijazi		Sharing
10	N10	North Gaza/UN		
11	N11	Jabalia/UN		
12	N12	Biet Hanoun/UN		
		Gaza		
10	G1	Shohadaa Al Shateëa	3	39,447
11	G2	Alshik Redwan	4	89,863
12	G3	Al Darag	3	47,966
13	G4	Al Houriah	2	36,562
14	G5	Shohadaa Al Remal	4	83,712
15	G6	Al Falah	3	21,454
16	G7	Al Salam	3	30,169
17	G8	Al Sorani	4	97,641
18	G9	Sabha AL Harazin	4	81,002
19	G10	Al Rahma	3	83,111
20	G11	Physical Disability Center	2	12,538
21	G12	Shohadaa AlZiton	4	82,291
22	G13	Ata Habib	2	16,023
23	G14	Alqubah	2	12,663
24	G15	Hala AlShawa(1)	2	6,967
25	G16	Al Moghraqa	2	9,201
26	G17	Joher Al Diek	2	1,665
27	G18	Shohada el zahra		Sharing
28	G19	Beach/UN		
29	G20	Shaikh Radwan/UN		
30	G21	Rimal/UN		
31	G22	Sabra/UN		
32	G23	Gaza Town/UN		
		Middzone		
27	M1	Western Al Nusirat	2	9,104
28	M2	Central Burieg	2	21,910
29	M3	Old Al Nusirat	3	46,070
30	M4	Shohadaa Al Nusirat	3	22,126
31	M5	Al Burieg	2	19,495
32	M6	Al Swarha	2	7,070
33	M7	Al Zwaidah	2	13,285
34	M8	Al Mghazi	2	18,291
35	M9	AlMsadar	2	5,133
36	M10	Deir Al Balah	4	75,367
37	M11	Heker Al jameëe	2	10,935
38	M12	Al Berka	2	5,931
39	M13	Wadi Al Salqa	2	8,430
40	M14	West Nuseirat/UN		
41	M15	Nuseirat/UN		
42	M16	Bureij /UN		
43	M17	D/Balah/UN		
44	M18	Maghazi/UN		
		Khan younis		
40	K1	Al Qararah	3	46,877
41	K2	Al Zana	2	10,380
42	K3	Shohadaa Khan younis	4	64,719
43	K4	Shohadaa Bani Souhaila	3	43,082
44	K5	Joret Allot	2	19,639
45	K6	Abasan	3	23,109
46	K7	Khaldiah Al Agha	2	9,783
47	K8	Shohadaa Abasan	3	26,908
48	K9	Khouzaa	2	15,567
49	K10	Al Foukhari	2	3,392
50	K11	El Amal		Sharing
51	K12	Kh/Younis/UN		
52	K13	Kh/Younis Japanese/UN		
53	K14	Maën/UN		
		Rafah		
50	R1	Al Mvasi Rafah	2	4,353
51	R2	Shohadaa Tal Alsoltan	3	43,125
52	R3	Al Shabora	2	11,010
53	R4	Shohadaa Rafah	4	98,582
54	R5	Al Shouka	2	15,547
55	R6	Tel Sultan/UN		
56	R7	Shaboura/UN		
57	R8	Rafah/UN		
58	R9	Naser /UN		
59	R10	Shouka/UN		

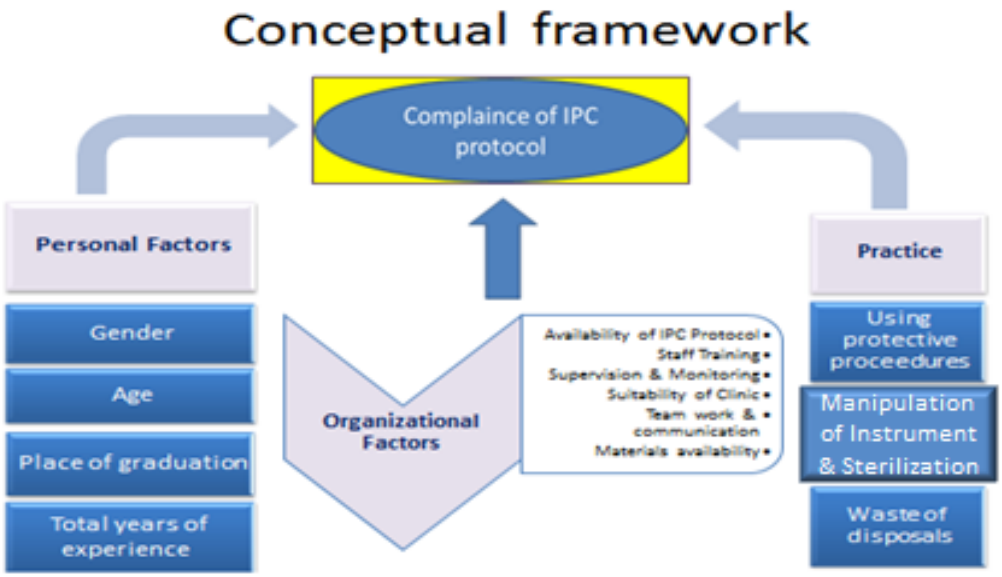
Note: Circled PHC centers in M.O.H.& Rectangle centers in UNRWA contains dental clinics.

Chapter 2. Literature review

2.1 Conceptual Framework

Conceptual framework is a visual or written product that is constructed and developed by the researcher in order to guide the research process, organize the work and make the research findings valuable and meaningful . It's one that “explains, either graphically or in narrative form, the main things to be studied. It incorporates pieces that are borrowed from elsewhere, but the structure the key factors, concepts, or variables the overall coherence, is something that you build and the presumed relationships among them, not something that exists readymade (Latham, 2016; Jabareen, 2009; Huberman, 1994). The main components of the study are the same factors of complience addressed in similar studies, which are affecting and guiding the IPC practice in dental health care services. According to the literature the compliance of DHCPs with the IPC Protocol arises from the interaction between three domains. The first domain which is the personal factors or the socio-demographic items which consists of four variables: the gender, age, place of graduation and total years of experience in practicing dentistry, the second domain which is the way the DHCPs practices the IPC protocol which consists of three variables: the use of protective procedures, manipulation of instruments and sterilization and the disposal of wastes, while the third domain is the organization factors (here it's the Dental Department in the PHC in The M.O.H. and the UNRWA in G.G.) which consists of six variables and they are : the availability of the IPC protocol, staff training and continuous updating of the staff practice , suitability of the dental clinic to practice the IPC protocol properly, supervision, monitoring and evaluation of the IPC protocol practice, team work and team communication and lastly the availability of good quality materials in quantity and distribution . The following figure shows the factors that will be studied in this study.

Figure 2: Conceptual Framework of factors influence compliance of DHCP with IPC protocol



2.2 Literature Review (Previous Studies)

The literature review is the classification and evaluation of what is accredited scholars and researchers have been written about the topic being researched, and organized in a sequence which guide the concept such as objective or the problem or the issue being addressed. (Abu Hamad, 2015)

2.2.1 Cross infection and it's prevention in dental care settings

Cross infection is defined as the transfer of harmful microorganisms as Parasite, Fungi, Bacteria and viruses between people, pieces of equipment, or within the body (Cherney, 2013; Senagore, 2004).

The operation rooms in hospitals are known as places of high risk of nosocomial infection (ALNegrish, 2008). In addition, nosocomial infections increase the burden for both patients and the healthcare system. For this reason IPC practices are extremely important. (ELJEDI, 2014). Nosocomial infection could occur in clinical theaters in universities,

clinics as in obstetrics, all fields dealing with bloods as in medical laboratories, nursing work places as dressing rooms (ALNegrish, 2008; Senagore, 2004), playing grounds in open fields, sewage work places, municipalities' trash dumping field areas with a lot of insects, dental clinics, wild or unfamiliar animals which are aggressive, unprotected sex or in intravenous drug use (Ashford et al., 2003; Ho et al., 2003; Kohn et al., 2003). Consequently, health education programs are required to increase the awareness for maintenance of infection prevention and control measurements (Schiff, et al., 1986).

Cross infection is prevented by vaccinations as in pediatric vaccination protection protocols and as booster doses for adults. Antibiotics treat bacterial infections. Parasites cross infection can be treated with antibiotics and dietary changes. Anti-viral drugs are used to treat certain types of viruses as hepatitis B and C. Anti-fungal medications are used for the treatment of fungal infections, either topical or oral applications. However, some strains of bacteria can become resistant to medical treatments, this resistance can lead to the eruption of "superbugs" and this bacterial resistance to antibiotics increases the risk of health complications (Cherney, 2013).

Routinely hand hygiene and sterilization of instruments can secure the adequate infection control in dental care practices (Molinari and Harte, 2010).

Globally, There are agreed procedures for cross infection control in the dental care settings include decontamination using alcohol solutions, drying surfaces, using protective gloves, hands washing, keeping the nails short and clean, not using rings and watches, and using face masks (MacIntyre et al., 2009, Ministry of Health, 2004; Kohn et al., 2003; Gould, 2002).

2.2.2 Risks for cross infection in dental care settings in the M.O.H. and UNRWA in Palestine

People in the Gaza Strip as well as populations in developing and low income countries suffer from exposure to high prevalence of infectious diseases. In the Gaza Strip, rates of infectious diseases have dramatically increased specially after the Israeli aggressive war on Gaza Strip on July 2014. These disease rate were documented in Palestinian M.O.H. reports per 100000 of population as following: Mumps rate was 1053.1/100000, Tuberculosis rate was 1.7/100000, Hepatitis B carrier rate was 14.3/100000, Influenza

H1N1 rate was 0.7/100000, HIV / AIDS rate was 0.06/100000, chicken pox rate was 206.8/100000, and Scabies rate was 177.5/100000. In addition, it found that Hepatitis C positive rate was 0.16% among blood donors (Ministry of Health, 2014).

The DHCPs in Palestinian M.O.H. and UNRWA are exposed to theses dangerous diseases and to a high load of work during patient treatments on each dental care clinic in the PHC centers (Ministry of Health, 2014).

Due to the lack of health care providers' knowledge, it's recommended that the IPC Protocol should be available in all primary and secondary health care establishments, and a qualified team should implement intensive IPC education and training programs to educate the health care providers (ELJEDI, 2014).

2.2.3 Development of cross infection control protocol in Palestine

There are number of studies about the compliance of health care providers with the infection control protocols was done. The studies were about the hemodialysis units in Gaza Governorates (Raid, 2017), the compliance of the DHCP in Al-Remal Maryter Clinic with the IPC protocol (Al-Kishawi, 2013), the compliance with the infection prevention and control protocol at the governmental pediatric hospitals in Gaza Governorates (Shareif ,2011) and adherence to infection prevention and control protcols in the neonatal intensive care units in the M.O.H. hospitals in Gaza Governorates (Awad, 2009). The Palestinian IPC protocol is available in the M.O.H. and UNRWA and used for prevention of cross infection in dental care clinics in the PHC in the M.O.H. (Ministry of Health, 2004) and UNRWA in the Gaza Strip (Abu Zaid, 2010).

Training workshops had been done for the DHCPs for manipulation of this IPC Protocol since the date of publishing it. Unfortunately this protocol is general and not specific for dental practices. The recommendations of the donors and the consultants of the protocol were not followed precisely by the DHCPs in M.O.H. and UNRWA and whether this protocol was updated every 2 years or not. Unlike the situation in UNRWA where the IPC protocol is distributed in the dental clinics as demonstrated in the study of the researcher Tamam Abu Zaid (Abu Zaid, 2010).

As mentioned before, patients attending the dental clinics may also get infection of blood borne pathogens by contaminated instruments or by direct contact of infected health team

(Abichandani, 2013). Previous studies shows that although there is high educational level for prevention of infections, a range of people still ignore the infection prevention and control protocol (McCarthy et al., 1999).

Elements such as, availability of good quality dental material, well established maintenance services by trained persons, ease of flowing and attendance of the patient to the clinic and receiving the good quality treatment in an acceptable time and availability of direct supervision on the dental health care provider him/herself, are considered elementary requirements to secure high quality practice and acceptable standard of dental treatment and high compliance with the infection prevention and control protocol among DHCPs in the dental health care institutions (Casemiro et al., 2007; McCarthy et al., 1999) . As illustrated previously, this is seriously essential to reduce the morbidity and mortality cases.

Thus, the IPC Protocol is developed to emphasize wearing disposable gloves, facemasks, protective eye goggles, magnifying glasses, face shield , protective apron, using sterilized instruments and decontamination of instruments before sterilization, having Hepatitis B vaccination , washing hands before wearing gloves and after getting it off by water and soap or by alcohol , proper dispose of wastes and needles in their safety box, decontamination of the field of practice by sodium hypochlorite and the use of disposable paper sheet on the field were instruments are placed (Ministry of Health , 2004).

2.2.4 Factors Affecting the Compliance of DHCP

2.2.4.1 Personal Factors

The compliance of DHCP with the IPC protocol depends on many factors; one of them is the socio-demographic characteristics, which include the gender, age, place of graduation, years of experience in the PDHC centers in the M.O.H. and UNRWA and total years of experience. Investigation of gender differences in practicing the IPC protocol, knowledge and attitudes about the treatment of blood borne disease patients indicated that female dentists were more likely than men to attend continuing education sessions and to use masks and eye protection (P<0.00001). Men have more economic concerns than women. They were more concerned about the financial burden of infection control costs (P<0.00001), and losing patients from their practice if it is known that they treat patients

with blood borne diseases (P<0.05). There were no significant differences in the ability to provide treatment for patients with HIV (MacDonald, 1996).

While regarding the age, population-based differences in practicing the IPC protocol and the acceptance and refusal to treat patients with HIV, a national mailed survey of a straight random sample of dentists in Canada (n= 6444) with three follow-up attempts was conducted. The variables included population, age, gender and continuing education on HIV/AIDS. The response rate was 66.4%. The younger age dentists showed best willingness to treat patients with HIV (compared with dentists≧60 years of age, OR = 8.6), attending continuing education on HIV/AIDS in the past 2 years (> 10 hours, OR = 1.6), and male had a better willingness to treat HIV patients than women (male OR = 1.3). Also older age dentists showed refusal to treat patients with HIV and Infection control practices varied significantly with age and population center. Dentists in communities of < 10000 were more compliant with HBV vaccination, but less compliant with hand washing after taking off gloves and the use of infection control manuals. On the other hand, dentists who were older than 60 years old were the least compliant with HBV immunization, routine use of barriers and sterilization of hand pieces, but reported the highest compliance with hand washing. (Gillian et al., 1999).

Another study research conducted among DHCPs in the Southern state of India declared that infection control practices among DHCPs are related to years of practicing experience and periodic evaluation of the knowledge, attitude, and practices of DHCPs in the field of IPC. This provides support for the planning of educational interventions to enhance the attitude and practices among DHCPs (Vikram, 2016)

2.2.4.2 Practice

This factor of assessing the compliance of the IPC protocol among the DHCPs in the PDHC centers in the M.O.H. and UNRWA in G.G. and includes the usage of protective barriers, such as gown, face mask, face shield, protective eye goggles, gloves, proper manipulation of the instruments, the proper manner of dealing with waste disposal, the knowledge about the Palestinian IPC protocol and it's use in the clinics. It's essential to consider the importance of implementation the IPC protocol, the extent to which the IPC protocol influence the DHCP practice at the dental clinic. The assessment of the client medical history regarding the IPC before caring for them and the documentation procedure

for each client condition regarding infection or infectious diseases in his health record file regardless the number of visits he paid, finally the importance of requesting the health record for each patient as starting step for his treatment, all these factors are fused together in believing of its effect of reducing the cross infection. (Oosthuysen, 2010; Wanessa, 2009 ; Qudeimat, 2006; Adebola and Foluso, 2004; Adrian, 1999).

2.2.4.3 Organizational factors (Department of the PDHC

2.2.4.3.1 The availability of IPC protocol.

This part of the research literature is focusing on the availability of the IPC protocol in the dental clinics in the PDHC centers of the M.O.H. and the UNRWA, which are going to be researched. This will highlight the importance of the protocol in the implementation of the cross infection control measures, (Duygu et al., 2009**)**. The real intention of the PHC to implement this protocol is the availability of materials needed to practice the IPC principles, which will provide the guides for the DHCP to be compliant all along the time of duty. This will be discussed and results will be measured by the use of the self-presented questionnaire distributed on the DHCPs who are on their duty in the dental clinics of the PHC centers in the M.O.H. and UNRWA in G.G.

2.2.4.3.2 Staff training and continuous updating of the staff practice

This part of the literature is pointing to the importance of the training sessions, program and workshops for the DHCP in a manner of keeping them updated with the latest procedures of the cross infection prevention principles which are implemented by other countries , organizations, or scientifically approved in a recent research study or via a referred scientific journal published newly, all this will protect the DHCP from gaining the infection and the diseases associated with the wrong manipulation of dental equipment (Adebola and Foluso, 2004).

The knowledge of hepatitis B virus, HIV as an occupational hazard in dentistry urged all DHCPs to apply an appropriate infection control measures. In a study done in southern state of India statistically significant difference had been found between the DHCPs with Bachelor of Dental Surgery and Master of Dental Surgery, as in their methods of hand piece sterilizations. The DHCPs with Master of Dental Surgery are better than the DHCPs

with Bachelor of Dental Surgery in their methods of hand piece sterilizations. (Vikram et al., 2016).

The usage of training course of the IPC protocol was held by the MARAM NGOs on November 2004 with the partnership with the Palestinian M.O.H. for the implementation of the IPC protocol which is adopted by the M.O.H. in the Palestinian territories. After that a continuous education & sessions of the IPC protocol kept for the next year then it was stopped (Palestinian Minnistry of Health, 2004).

Meanwhile training courses for dental treatment was held through the video conference with the University of Jordan in Jordan and the University of Ain Shams in Egypt. (Ministry of Health, department of Human resouces development, 2011) We are intending via this research to place the IPC Protocol as a training session updated every 2 years as it's recommended from the beginning of publishing the protocol in the M.O.H. and a subject of the internship for the interns to be examined by as a part of requirements to get the certificate of practicing dentistry in the Palestinian authority territories. In Tehran University of Medical Sciences (TUMS), the students must complete an infection control workshop before they start their clinical education (Seyed, et al., 2011).

To get the proper training courses you need three elements to be provided. The first factor is the facilities as buildings and equipment, which are available in an acceptable amount. The second factor is the presence of qualified trainer, which is also available as there are departments in the M.O.H. which named the Department of quality improvement and infection control and the Department of Human Resources Development Department. These two departments are concerned with this training courses and workshops. The third factor is the presence of learning well by the employee to develop himself and update his/her knowledge of practicing the cross infection procedures which is a question will be answered by the research results.

2.2.4.3.3 Suitability of the dental clinic to practice properly the IPC Protocol

This includes the suitability of the dental units to practice IPC protocol properly which are the availability of material and their amount (such as the disinfecting solutions, protective barriers, clean water and sharp box), the way of waste disposal, proper ventilation of the dental unit, and the arrangement of these items in a way that provide easy use of them with

maximum standard precaution plus enough space of the clinic to help the DHCP performing his duty in an acceptable professional manner. It's very important that the manufacturer of dental devices provides written instruction about the compatibility of them to chemical liquid, whether the equipment can be safely immersed and the proper method of decontamination.(Journal of the American Dental Association, 1996).

The DHCPs who provide cleaning duty and disinfection should wear a protective uniform , utility gloves and another protective measurements to prevent occupational exposure to infectious agents and chemical hazards. As there is a high risk of getting infection from contaminated surfaces and chemical disinfectant. Also to prevent accidental injury from sharp instruments and wastes. The availability of alcohol swab for hand scrubs, alcohol hand rub, latex gloves, all these will increase the compliance of IPC protocol by the DHCP. (Centers of Disease Control, 2003; James and Marks, 2003).

2.2.4.3.4 Supervision, monitoring and evaluation of the IPC protocol practices & documentation of the results

Supervision is the procedure of supporting others in order to give better client treatment and services by allowing professional practice. This is done by effective program evaluation in a systematic way, to make sure that these procedure are implemented in a proper, useful, ethical, and accurate method, And it's a process of supporting other DHCP. Supervision also reduces medical errors made by DHCP or to prevent mistakes being done by others. (Abu Zaid, 2010).

The evaluation for compliance with IPC protocol should be done periodically by observational assessments, checklist applied by the supervisor for both the practice of the DHCP and for the environment. This will increase the implementation of the IPC protocol for both the dental practice and the cross infection control measures, and will correct any faulty procedures done either intentionally or accidentally.

Feedback of the supervision evaluation is given for the DHCP which is submitted for him either orally or in a written form and for the official work and documentation it's better for the DHCP to receive their evaluation in a written form to be archived in their employment record file. Evaluation of the effectiveness of the IPC protocol is done in systematic way to ensure the compliance of the DHCP.

Also the updating of the IPC protocol should be done periodically every 2 years as it recommended by the establisher of the protocol implementation in the Palestinian territories.(Ministry of Health, 2004).

2.2.4.3.5 Team work and team communication

The team work and co-operation is very important in the field of dentistry , especially in the process of job distribution, providing the proper dental care and cross infection control measures, waste disposals and keeping the maintenance of the instruments. Also team work saves time needed for treatment or taking care of the client and provide good quality of services delivery.(Morison, 2008; Qudeimat et al, 2006; Adebola Foluso, 2004).

2.2.4.3.6 Availability of good quality materials in quantity and distribution

This part of the research is dealing with the quality of materials used in providing an acceptable level of client care and the materials that used to provide disinfection for the equiment, instruments and maintaining the healthy and clean field of work. (Miller and Palenik, 2014).

The quality of materials include gloves in different sizes to fit the size that needed for the DHCPs, low mercury filling amalgam since its vapor is dangerous on the male genital system of the DHCPs and it can be absorbed through the skin, so this type of filling material should be handled carefully and the DHCP should wear gloves in his/her hands and face mask to protect his respiratory system Miller and Palenik, 2014).

The availability of face mask in a proper quantity in the clinic to be used by the DHCP, also the plastic bags for waste collection and its distribution according to the international standards (McCarthy et al**,** 2000). The materials used for the disinfection of the instruments, keeping the field clean and hand hygiene are essential in the prevention of cross infection from the DHCP to the client or vice versa. It includes alcohol, setrosept, sodium hypochlorite solutions. The suction tube for the power suction unit and the saliva ejectors are important in a way that facilitate the treatment and provide good quality of work. Also the availability of towel paper for dental chair is important in which the instruments are placed on the towel paper which is on the dental tray. All these are standard precaution materials

Gown or lab coats wear to protect skin and prevent soiling of clothing during activities that are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions.; (Center for Disease Control and Prevention, 2013; WHO, 2007).

Another item is the proper coverage of the hepatitis B vaccination for all the DHCPs by providing enough quantity of the doses required for the subjected people who are in risk of getting the infection.

2.2.5 The impact of compliance with the IPC protocol practices

The patients are looking for high quality performance, so the increased compliance with the IPC protocol increases the patients trust and the confidence of the dental health team(this is not limited to dentistry only, but it's carried for all aspects of health). This has two impacts , the first is saving lives of clients and reducing the morbidity and the mortality rates as reducing the spread of infection, so that would protect the clients, DHCPs, community from infection. A standard strategy precaution should be implemented to provide such protection and to avoid spread of infectious diseases and includes hand washing between every patient, wearing gloves, facemasks, protective eye goggles, face shield, hepatitis B vaccination, using proper decontamination procedure , safe work place and good waste disposal way. The second impact is that the reduction in the number of cross infection cases, consequently the number of people seeking for medical care will be reduce (CDC, 2003; infection control recommendation for the dental office and the dental laboratory, 1996).

2.2.6 Infection prevention and control definition

It's defined as the methods used to inhibit the spread of infectious diseases and it's the responsibility o all DHCPs. The CDC defined it as some measures implemented by the health care provider in order to minimize the transmission of infectious pathogens by various methods of practice as washing hands between each patient, wearing gloves, protective eye goggles, disposable facemasks, face shield, gown and apron.(CDC,2003). Another definition of IPC protocol is, the different practices done by the health care provider to reduce the cross infection and restrict its spread. The IPC is important to both of the client, health care provider and the whole community as all (WHO, 2007).

The infection control are not a fixed methods or procedures but are dynamic full of new practices as the science advances, and all DHCPs should be kept up to date to prevent the transmission of infection. So by understanding the way of cross infection, dental personnel will reduce the probability of getting the infection and prevent the disease transmission. (McCarthy et al, 1999).

2.2.7 Component of infection prevention and control protocol practices

2.2.7.1 Compliance with hand washing

The hand hygiene is very important in the success of treatment and reduction of case failure as a basic step in infection prevention. Since there are a resident micro flora we can't remove it from the hands and the oral cavity so by maintaining hand hygiene we can minimize the number of microorganisms present on the hands by continuous use of water and soap before putting on the gloves, after disposal of it and between cases. This will provide better hygiene which will increase the success rate of dental and medical intervention.

Although the previous mentioned statements many dentists don't wash their hands after removal of gloves. (Al-Omari and Al-Dwairi, 2005; McCarthy et al,1999).

2.2.7.2 Compliance with hand gloving

The hand gloving is very important step or procedure of IPC protocol , which aims in prevention of cross infection from the patient to the dental health worker, from the DHCP to the patient, from a patient to anther or the field environment. All staff should wear gloves before contacting with blood or saliva or any other biological fluid to prevent transmission of microorganism (CDC, 2003).

All health care providers should wash their hands either with water and soap or by alcohol based gel before wearing gloves and after getting off the gloves, also the gloves should be changed between every patient, in case the gloves are punctured or become contaminated with solids for the same patient. Another thing that the DHCP should choose the suitable type of gloves and the suitable size to fit hands. All this procedures should be performed in order to prevent the risk of cross infection from one part of the body to the other (Pankhurst, 2017; CDC, 2003). Gloves should be worn before any clinical procedure with

the patient and got off after the completion of the dental procedure, then disposed properly in the disposal drum (Mona, 2006; CDC, 2003).

There are different types of gloves as powdered or non-powdered this has a strong relation with allergic reaction to the latex type of the gloves itself. There are latex gloves, Nitrile gloves and Vinyl gloves. The bottom line is that latex gloves are recommended for high-risk situations involving potential pathogen exposure. Nitrile gloves are an excellent alternative to latex because it shows comparable barrier qualities, also they are an excellent choice for latex-sensitive individuals. Vinyl gloves are suitable for most low-risk, short-duration tasks. To reduce the potential for powder associated complications, powder-free latex or synthetic gloves should be considered for all dental procedures. (Wann, 2016; CDC, 2003; USAF Dental Evaluation & Consultation Service, 2000)

There are sterilized and non-sterilized gloves, were the sterilized type is more frequently used during surgical manipulation procedures rather than in non-surgical procedures. Although there is no difference in postoperative infection rates after normal tooth extraction when the dental surgeon wears sterilized surgical or non-sterilized latex gloves, the use of surgical sterilized gloves during surgical procedure is more theoretically acceptable (CDC, 2003), since it has no punctures which minimizes the transmission of cross infectious pathogens among the patient and the practitioner. All these will provide much more protection to the DHCPs.

Another type of gloves is the utility gloves (Nonmedical Gloves) which are more rigid, firm, thicker, lined from inner surface and not easily ruined, Should be puncture- or chemical-resistant, depending on task It's used for disposal waste issues, handling contaminated sharps or chemicals, for cleaning for the environment and decontamination procedure for the field itself housekeeping procedures (e.g., cleaning and disinfection), not for use during patient care. They must be cleaned after use and Sanitize after use labeled with the user name, washed with water and detergents, hanged to dry and disposed and replaced if they get tear.(CDC, 2003; Kohn et al., 2003; American Dental Association, 1996).

2.2.7.3 Compliance with using face mask, eye goggles, uniform, face shield

The use of mask and protective eye goggles plus the surgical shield and the uniform have a very much impact on the psychology of the patient acceptance for the dental procedure

which are carried by the DHCPs, also they have a protective effect for the DHCP him/herself from the cross infection of the blood borne pathogens and the saliva generated from the rotating instrument during the treatment across the field of work.

The masks and the face shield are disposable parts and not reusable from a patient to another. They should properly fit the dental health workers' face and nose and protect the eye from the remnants the scatters. Also they should be put on during any sterile procedure and using of devices where there could be a possibility of transmission of infectious airborne pathogens.

The uniform or gown should be worn by the dentist to prevent the transferring of microorganism from the work field to the dentist's home or any place outside the working field. Also the gown or uniform should be daily changed or when it gets a visible solids, it protects skin and prevents soiling of clothing during activities that are likely to generate splashes or sprays of blood or even secretions (WHO, 2007). Another recommendation is that the protective eye goggles, disposable face mask and the protective face shield are basics protective facilities to prevent the infectious microorganisms from getting to the respiratory system or the eyes or the skin of the DHCP. All these recommendations will subsequently get their effect on the protection of the patient himself. (Annalee et al., 2004; CDC, 2003).

2.2.7.4 Compliance with instrument and sterilization

The instruments should be clean and sterilized when they are used. After their use they should be cleaned, decontaminated and sterilized according to the manufacturer instructions.

It's very important that the manufacturer of dental devices provides written instruction about the compatibility of them to chemical liquid, and whether the equipment can be safely immersed and the proper method of decontamination (Anon., 1996)

All new instruments should be decontaminated before use with hypochlorite 0.5% and it should be sterilized properly based on the manufacturer instructions. Systematic process is preferred by cleaning, decontamination of instruments with running water, immersing in decontaminant solution to remove solids and fixed blood then washing under running water, then drying these instruments. All these steps should be done by DHCP according to

the IPC protocol which means that the health provider him/herself should be protected by wearing a gown or a uniform of suitable size , type of gloves and face mask covering his/her mouth and nose as well. Then the instruments should be packed according to its size and type and the date which is written on the self-seal pack before being placed into the sterilizer (the hot steam auto clave) (M.O.H., 2004).

This procedure is applied for all instruments which present on the same tray (used and unused) which should be considered as contaminated (CDC, 2003).

2.2.7.5 Waste disposal

The dental material that used during the professional treatment is producing a lot of wastes which should be treated carefully by DHCP. In the theater field the spillage of any saliva or blood from the patient during any dental procedure even at mouth rinsing with a cup of clean water, that would produce a hazardous situation which should be treated immediately by covering it with a towel and placing 5% hypochlorite solution then leave it for 5 minutes before removing the towel in the presence of good ventilation (M.O.H., 2004; CDC, 2003).

After that the towel and the waste tissues should be collected and placed in a foot controlled drum. At the end of day the cleaner or the health care worker can collect these disposals, (as solid wastes) and place them in suitable coloured waste bags according to the degree of its risk of cross infection, Meanwhile offensive or hygiene waste which are defined as non-hazardous, as soft wastes which are not contaminated with fluids for example PPE, un contaminated tissues and swabs only where saliva with no infection risk is present and hygiene waste from toilets and nappies, all are placed into black bags or tiger bags .as the tissue or papers has no risk of cross infection of it. While soft clinical waste which are defined as hazardous waste should be disposed of in an orange bags which are used to dispose of blood contaminated dressings, PPE, swabs and other wastes that may present a risk of infection, including saliva-contaminated items from known infectious patients or where medical history is not available, all these should be placed in an orange bags containers (Not forgetting that the worker should protect him/herself wearing the uniform or gown , utility gloves, facemask). Also all the sharp disposals should be placed in a solid container or sharp box made of thick plastic or carton , in order to prevent the needle stick injuries and from other sharp instruments, (WHO, 2007; CDC, 2003), and

after that it should be disposed by authorized trained person to an authorized place for disposing medical wastes. All this is done to prevent unintentional injury. Where needles should not be recapped again using hands but we should use one hand technique, without pointing the needle tip toward the body (McCarthy et al, 2000).

2.2.7.6 Compliance with immunization protocols

All DHCPs should be immunized against Hepatitis B virus**,** which is essential in IPC protocol to protect them from the hepatitis B viral infection. Because it's illogic to ask all the dental clinic attendants to examine for hepatitis B virus and HIV, the DHCP should deal with his/her clients as they are HIV, Hepatitis B infected persons. All these considerations will throw its weight on the importance of immunization of the DHCPs a study was conducted with the dental health workers at the dental hospital of the Obafime Awolowo University teaching hospital. It found that 68.4 % of the study population had been vaccinated against Hepatitis B virus. This study showed that compliance of the DHCP of immunization was acceptable (Adebola and Foluso, 2004).

2.3 Critique of the Palestinian IPC protocol

The IPC protocol should be updated every 2 years. Since the date of its declaration no updating has been conducted. The IPC protocol is general and not specific for the dental field, because it doesn't include the proper handling method of dealing with certain dental devices (by comparing the IPC protocol with the guidelines of the dental Health Care setting) (Marks, 2003).

Chapter 3: Methodology

3.1 Study design

The study design is a quantitative, cross sectional descriptive observational analytic study. it tried to answer the questions about the compliance with the IPC protocol among DHCP in both of the P.H.C. in M.O.H. and UNRWA. Also it assessed the suitability of the dental units to the IPC standards. This cross sectional observational design was selected because it's less expensive and consumes a shorter time.

3.2 Place of the study

The study was carried out in all dental clinics of the PHC centers of the M.O.H. in the five Gaza Strip Governorates (North Gaza, Gaza City, Mid-zone, Khan-Younis, and Rafah) and UNRWA dental clinics. Annex No. 1 shows the map of distribution of PHC centers of the M.O.H. and UNRWA in the five Gaza Strip Governorates which contains dental clinics.

3.3 Study population

The study population was DHCP employees in the PHC of the M.O.H. and UNRWA in the Gaza Strip and they were dentists, dental assistants, oral hygienists, dental nurses and practical nurses. The total number of DHCP employees in the PDHC of the M.O.H. in the Gaza Strip in 2016 was 98, (67 dentists and 31 practical dental nurse) (Ministry of Health , 2016), the total number of employees in the dental units at the UNRWA PHC centers were 43 persons,(25 dentists, , 16 practical nurses, 1 dental nurse and 1 oral hygienists) (UNRWA, 2016). The total all number of DHCPs was 141 working in 26 dental clinic in PHC in M.O.H. and 19 dental clinic in UNRWA in the Gaza Strip.

3.4 Sample Size

The census was 97 DHCPs who were employees in the PHC in the M.O.H. (Palestinian Ministry of Health , 2016) and who were working in the 27 dental clinics and 40 DHCPs employees in the 19 dental clinics at the UNRWA PHC centers. (UNRWA annual report 2016). Thus the all census of the DHCPs was in total 137 employees who is working in 46 dental clinic, (27 dental clinic in P.H.C. in M.O.H. and 19 dental clinic in UNRWA in the Gaza Strip). After excluding 1 person maternity leave and 3 persons sick leaves.

There was 3 times collection of checklist of practice for each DHCP (3×137=411) in addition to completing 46 checklists of environment of the 46 dental clinic plus the self-administered questionnaire of 137 employees completed by employees themselves.

3.5 Study timeline

The timeline for the study was from 1st of January 2016 through 17th of June 2017. After preparing the study proposal and securing the ethical approvals by the researcher himself. The data collection had taken around 20 weeks, followed by data cleaning, coding, entry and analysis which took 6 weeks. The rest of the period was necessary to complete the study and writing up the report.

3.6 Eligibility Criteria

The inclusion criteria of the research study was all the employed DHCPs and practicing the job in the dental clinics of the PHC in the M.O.H. and UNRWA in the Gaza Strip.

3.7 Exclusion Criteria

The research study excluded DHCPs who were intern spending their internship period in the dental clinics, volunteers, all DHCPs who were not employed in the M.O.H. or the UNRWA, also the females who were at maternity leave at the time of data collection (1person) and DHCPs who were in sick leave (3 persons) .

3.8 Ethical consideration

All ethical concepts was considered, respect for people and respect for truth, anonymity and confidentiality were maintained by using serial number for each subject and their names not inserted into the SPSS program.

The researcher secured the Helsinki Committee agreement from the Palestinian Health research council (annex 1). Ethical approvals were obtained from M.O.H. (annex 2) and UNRWA (annex 3). Informed consent from DHCPs employees (annex 4 and 5). The informed consent provided complete explanation about the research purpose, confidentiality and informed that participation with research is optional.

3.9 Methods of the study and questionnaire design

The researcher distributed a self-administrated questionnaire (annex 6) for all DHCPs employees in the dental clinics of PHC of the M.O.H. and UNRWA in the Gaza Strip. IPC checklist is observing the practice and the environment of cross infection control in dental clinic as in Annexes 7 & 8.

Based on that, the methods of the study and questionnaire design was in 2 basic parts. The first part was self-administrated questionnaire includes closed and open-ended questions about DHCPs' socio and demographic characteristics and practices in relation to IPC protocol, materials availability in the dental clinics and DHCPs' views, comments and concerns on the importance of IPC protocols. The second part is two checklists which fits the need for the research study in the dental clinics. An IPC practice checklist was done 3 times for each DHCP. An IPC environment checklist was done for the dental clinics. The checklists were completed by the researcher himself.

3.10 Validation

To check for the validity of the self-administrated questionnaire and observational list, a list of 12 experts, university academics professors and assistant professors , head of dental departments of PHC in the M,O,H and the UNRWA, their deputies and head of dental nursing sector in the department of nursing in the PHC in the M.O.H., were prepared (See annex 9). It includes academics, public health, and dentistry specialists. Their replies were revised and integrated in the questionnaire and observational lists. The validating experts added some important questions as for the need of the research as in section C your comments in regarding e needle stick injury and it's protocol availability. The questionnaires used for pilot study were not included in this research. After updating for the questionnaires based on validation process outcome, the participants re-asked to complete the validated questionnaires.

3.11 Reliability

To secure high reliability, the researcher collected the data himself. Thus, the inter-observer variation was eliminated.

3.12 Piloting

The questionnaire was piloted among 20 DHCPs from different areas in all G.G. to test the suitability of the questionnaire before the data collection, the questionnaires were revised in the light of piloting, such as many changes like verbal and sequential changes of questions. Additional questionnaires and checklists were added after the validation and then the data is collected for the whole census.

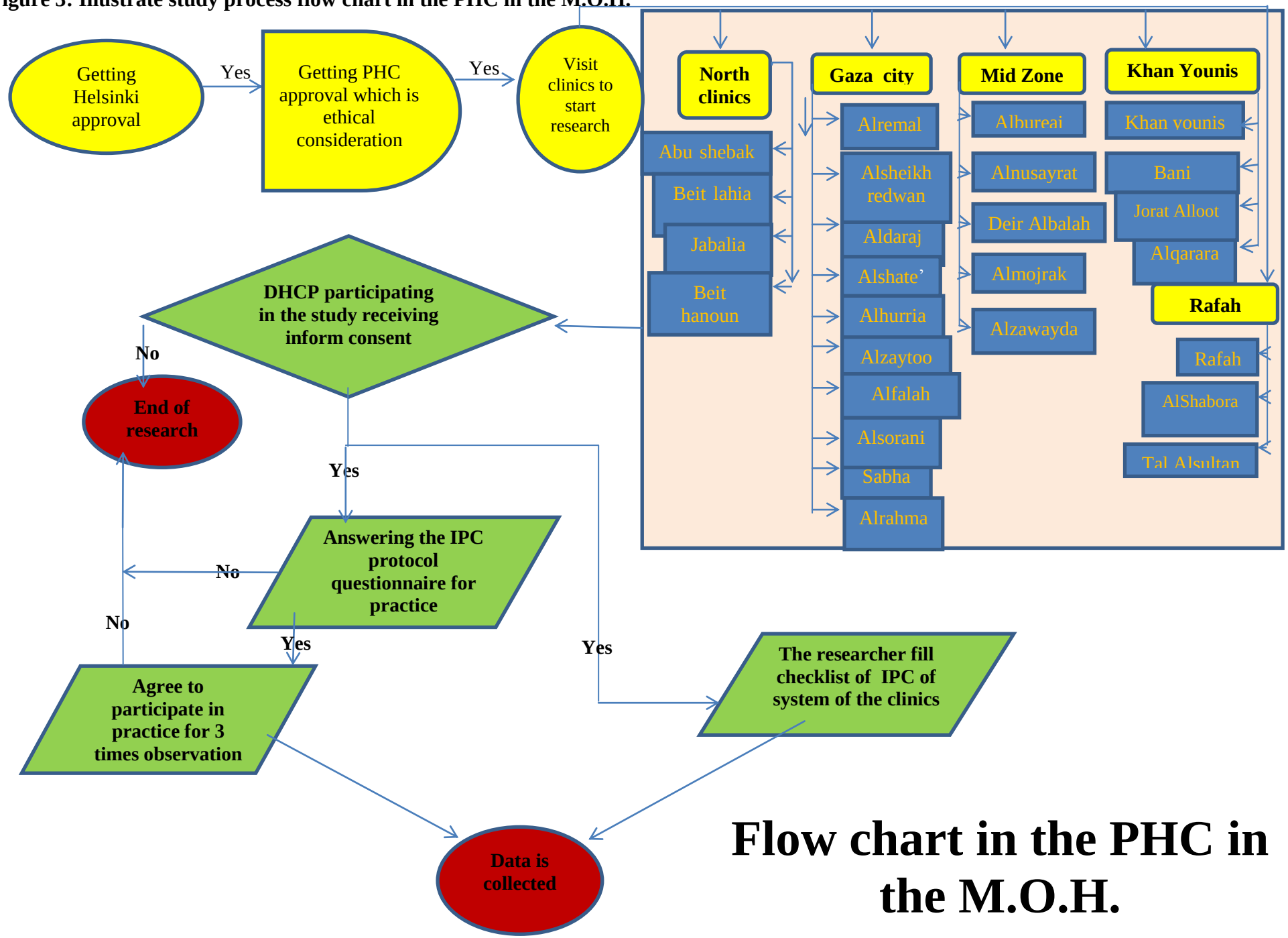
3.13 Data Collecting

Study process was illustrated in figure 3. After securing the Helsinki and the M.O.H. and UNRWA approvals, the researcher visited all dental clinics in the PHC in the M.O.H. and UNRWA in the Gaza Strip and completed the observational checklists by himself for each dental clinic. After that, the researcher distributed the self-administrated questionnaire for each participant to complete it.

All these mentioned procedures were secured and confidential. The estimated steps were checklist of the IPC protocol self-administered questionnaire which were filled by the participant him/herself, IPC protocol practicing by the participant were evaluated three times for each DHCP by the researcher himself, the IPC protocol for the environment, (instruments and materials availability), was completed in the same day of data collection for each dental clinic by the researcher himself. The estimated time for each participant to complete the questionnaire was about 25 minutes, the average time for the observing IPC practice checklist completion was 30 minutes for each person in each episode of the 3 times.

The researcher ensured that the participants who accepted to participate in the study answering all questions in the questionnaire before leaving the dental clinics.

Figure 3: Illustrate study process flow chart in the PHC in the M.O.H.



3.14 Response Rate

Based on the results of similar studies conducted in UNRWA dental clinics in the Gaza Strip and had a 100% response rate (Abu Zaid, 2010) and other studies conducted in Jordan and assessed the compliance of infection control programs in private dental clinic and showed that 91.66 % response rate (Al-Omari and Al-Dwairi, 2005), the response rate to this existing study was 97.16 %.

3.15 Data Entry and Analysis

The researcher used SPSS program version 20 for data coding, entry and analysis. All this was done by the following steps:

- Giving serial number for each participant and involved in self-administered questionnaire.
- Designing data entry model by SPSS.
- Defining variables.
- Coding variables.
- Data cleaning by: providing general view of data, check its frequency, and double check data entry.
- Presentation of the study research variables using frequency distribution tables and graphs.

3.16 Data Analysis

The results of the study were presented in descriptive tables and figures.

Cross tabulations between, the continuous dependent variable, the compliance of DHCPs IPC protocol and categorized independent variables such as demographic characteristics, the location of the clinic according to the governorates of Gaza Strip, the level of education of the DHCPs, the years of experiences and the availability of protection materials, protocol copies and training courses.

Statistical testing used were:

- Chi square test: to study the relation between two or more qualitative variables. It compares the observed frequencies with expected frequencies to determine whether the deviations are significant (Kuzma, 1992).
- t-test for comparing the means between variables which have only two categories
- One Way ANOVA test for comparing the means between variables having more than two categories.

Results were considered statistically significant when P-value < 0.05.

P-value is the probability that the value of the calculated test statistics occurred by chance alone (Kuzma, 1992).

3.17 Study Limitations

In General, the research in the Palestinian Territories exposed to different limitation as follows:

- Unavailability of fund: the study was funded by the researcher himself (annexes 9) since there are no donations from any agencies.
- DHCPs employees and are not practicing their job duty in the PHC clinics of the M.O.H. and UNRWA at the Gaza Strip could not be included in the study samples.
- The studied dental clinics are only in the PHC in M.O.H. and UNRWA in the Gaza Strip. The study did not include the private and the NGOs dental clinics. It was limited to the dental clinics in PHC in M.O.H. and UNRWA in the Gaza Strip only and doesn't include the rest of the dental clinics of the M.O.H. and UNRWA in the West Bank.
- The checklist of the IPC practice would be affected by the Hawthrone effect, which may affect participants' behaviors. Thus each checklist were collected 3 times for each DHCP.

3.18 Research Tools and Requirement

The researcher used available resources in Al Quds University and in Palestinian Territories to secure information for cross infection control and compliance with IPC protocol in Palestine and worldwide. These resources include:

- Previous studies and annual health reports available in Al Quds University and Palestinian Universities
- Electronic libraries and database provided by Al Quds University
- Annual health reports and related studies published by M.O.H., UNRWA and relevant ministries and association.

Chapter 4: Results and Discussion

The main aim of the current study was to assess the compliance of PHCP with IPC protocol in the dental clinics of PHC centers in M.O.H. and UNRWA in the Gaza Strip - Palestine.

The data collection started from 31/8/2016 to 30/1/2017. It included PHC centers were in M.O.H. and in UNRWA.

The census was 97 DHCPs employees work in 27 dental clinics in the PHC in the M.O.H. as there was 1 DHCP excluded because he was on sick leave and 40 DHCPs employees work in 19 dental clinics in the UNRW-PHC centers as there were 2 DHCPs excluded because they were in sick leaves and 1 female DHCP also excluded because she was on maternity leave. The census total was 137 DHCPs who work in 46 dental clinic.

The data collection procedure included the completing of 137 self-administered questionnaire and checklist of practice collected 3 times for each DHCP, so (3*137) thus 411 in addition to 411 checklist of environment of the dental clinics.

This chapter illustrates the findings revealed by the analysis of the collected data. The chapter starts by descriptive statistics, which demonstrates the study, the socio-demographic and professional characteristics of the study participants, as it included 82 male (59.9%) and 55 female (40.0%).

The total number of questionnaires completed by DHCPs were 137. The researcher completed three observational checklists for the DHCPs who participated in the study and they were in total of 411 checklist, overall the total number of questionnaires and checklists of observation for compliance with the IPC protocol practice collected 3 times for each DHCP completed by the researcher himself were 548. It was calculated to provide an accurate informational data of the compliance of the DHCPs for each item in a percentage and statistical significant difference for each question. The response rate for this study was 97.16 % as all the participants completed the study. There were 3 DHCPs had sickness leave and 1 person had maternity leave. Thus these 4 DHCPs did not participate in this study.

4.1 Characteristics of the Study Population

4.1.1. Socio-demographic and professional characteristics

The study participants were 137 DHCPs, 97 of them were working in the M.O.H. and the rest 40 DHCPs were working in UNRWA. These DHCPs were distributed in the five governorates in the Gaza Strip as fellows: 58 participants were in the Gaza City, 19 participants were in North of Gaza, 22 participants were in the Mid-Zone, 25 participants were in Khan-Younis and 13 participants were in Rafah.

Table 4.1 shows that approximately, third (37.2%) of the participants were at the age group of (36 to 45) years old. Two thirds of the participant (62.1%) obtained their dentistry qualifications from Arabic countries including Palestine. Only 6.6% of the DHCPs had master in dentistry. More than half of the study participants were males (59.9%) and (40.1%) were females. The majority (97.1 %) of DHCPs were married and had vaccination (97.8%) against infectious diseases (including Hepatitis B). This is better vaccination coverage rate in participants than the results of the conducted study survey on the DHCPs at the dental hospital of the Obafime Awolowo University teaching hospital, were (68.4 %) of the study population had been vaccinated against Hepatitis B virus.(Adebola and Foluso, 2004).

Table (4.1)
Socio-demographic characteristics, qualifications and vaccination history of participants

Demographic Data	**No**	**%**
Age		
35 Years old and younger	35	25.5
From 36 to 45 Years old	51	37.2
From 46 to 50 Years old	23	16.8
More than 50 Years old	28	20.4
Total	**137**	**100.0**
Highest Degree Awarded in Dentistry		
Bachelor	88	64.2
Diploma*	40	29.2
Master	**9**	6.6
Total	**137**	**100.0**

Table (4.1) *Continue*
Socio-demographic characteristics, qualifications and vaccination history of participants

Place of graduation		
Palestine	43	31.4
Arab Country	42	30.7
Europe (East and West)	36	26.3
East and South East Asia	16	11.7
Total	**137**	**100.0**
Gender		
Male	82	59.9
Female	55	40.1
Total	**137**	**100.0**
Marital Status		
Not Married	4	2.9
Married	133	97.1
Total	**137**	**100.0**
Have you been asked about having vaccination against infectious diseases		
Yes	134	97.8
No	3	2.2
Total	**137**	**100.0**
If yes, what type of vaccination you have		
Hepatitis B	134	97.8
Others	0	0.0
Total	**134**	**97.8**

* Diploma is a 3 years study in a collage of nursing and the participant will be certificated to practice nursing after graduation

Table 4.2 illustrates the dentists who were employed in the acting positions as head of department and as dentists represents 30.7% and 35.8% of participants respectively. All of them had permanent employment contracts with the Palestinian M.O.H. or with UNRWA. Around two thirds of the participants (64.2%) did not work in other organizations before their employment, only 21.2% of the DHCPs were working in M.O.H. or UNRWA for less than11 years and 88.8% of the DHCPs were working in M.O.H. or UNRWA for more than 10 years. The distribution of DHCPs within the four categories of the years of experience

in dental settings since graduation was similar and more than half (59.1%) the DHCPs don't have private clinic**.**

Table (4.2)
Professional and Work Information by providers in M.O.H. and UNRWA

Work	**No.**	**%**
Profession		
Dentist acting as head of clinics	42	30.7
Dentists	49	35.8
Nurses	22	16.1
Dental Hygienists	4	2.9
Dental Nurses	20	14.6
Total	**137**	**100.0**
Working in another organization		
Yes	49	35.8
No	88	64.2
Total	**137**	**100.0**
Years of employment in M.O.H. or UNRWA		
10 years and less	29	21.2
From 11 to 15 years	54	39.4
From 16 to 20 years	30	21.9
More than 20 years	24	17.5
Total	**137**	**100.0**
Years of Experience in dental setting since graduation		
10 years and less	28	20.4
From 11 to 15 years	38	27.7
Work	**No.**	**%**
From 16 to 20 years	40	29.2
More than 20 years	31	22.6
Total	**137**	**100.0**
Do you have private clinic		
Yes	56	40.9
No	81	59.1
Total	**137**	**100.0**

4.2 Training on IPC protocol

Continuous education and training programs are essential for the DHCPs in order to update the new medical knowledge and to increase the compliance with IPC protocol. As remarked from the collected data analysis only 5.8% of the DHCPs were involved in the preparation of the IPC protocol during their work in the M.O.H. and the UNRWA, 60.6% of the DHCPs had received training courses on the IPC protocol, we can see that there is 39.4 % of the DHCPs didn't receive any training courses on the IPC protocol practices this is due to financial, managerial and political problems ,56.4% of the participants were using the training in service, 96.4% were interested in training courses of the IPC protocol and 97.1% illustrated that dentistry education curriculum which they had incorporated training about IPC protocol, (see tables 4.3)

From the data in the table below we can see that there is a great improvement in the no. of DHCPs who received the training course of IPC and the dental attitude and interest of attending training courses in the UNRWA and in a comparison with the study which had done on the IPC protocol compliance by the DHCP in the UNRWA (Abu Zaid, 2010) also it's in the same direction. (Seyed, 2011; Adebola and Foluso, 2004.)

Table (4.3)

Comparison between DHCPs in MOH and UNRWA on Training about IPC protocol

Question		MOH		UNRWA		Total		X^2 or Fisher test	Sig.
The total participant No. 137		**No**	**%**	**No**	**%**	**No**	**%**		
Have you been involved in the preparation of any infection prevention control protocol during your work in M.O.H or UNRWA	Yes	5	5.2	3	7.5	8	5.8	0.283	0.428
	No	92	94.8	37	92.5	129	94.2		
Did you receive any training courses on the IPC protocol practices?	Yes	54	55.7	29	72.5	83	60.6	3.359	0.049
	No	43	44.3	11	27.5	54	39.4		
Is this training course is part of the In-service training in your clinic in M.O.H. or UNRWA?	Yes	48	49.5	29	72.5	77	56.2	3.146	0.207
	No	6	6.2	0	0.0	6	4.4		
	*DK	43	44.3	11	27.5	54	39.4		
Are you interested in a training course on the IPC protocol practices	Yes	92	94.8	40	100	132	94.6	fisher 1.237	0.343
	No	2	2.1	0	0.0	2	1.5		
	DK	3	3.1	0	0.0	3	2.2		
Does your basic education curriculum incorporate training about IPC protocols?	Yes	94	96.9	39	97.5	133	97.1	0.035	0.667
	No	3	3.1	1	2.5	4	2.9		

*DK: Don't know

4.3 Availability of IPC protocol in M.O.H. and UNURWA centers

The availability of the IPC protocol written copy in the dental clinics is very limited as 68.6% of the DHCPs didn't have a hard copy of the IPC protocol and most of the them were in MOH, (92.8% of the DHCPs), while only 10% of the DHCPs who didn't have a hard copy of the IPC protocol were in UNRWA. Meanwhile 10.9% and 2.9% of the participants showed the researcher an IPC protocol copy in English and in Arabic respectively. Out of the 40 participant who had a written copy of the IPC protocol, 28 participants (70%) were asked to read it before starting their jobs, while only 13 (38.2%) of 34 participants had been asked to sign documentation confirms their reading of IPC protocol. Around 64.7% of the copies of the IPC protocol available in the dental clinics were stored in the P.C. (personal computer) as soft copy.

The availability of the IPC protocol in each clinic and even for each DHCP is very important because it could increase the compliance of the IPC protocol and the knowledge of the employees**,** (Duygu S., Emir Y., Sevgi C., Seda C., et al., 2009). There is an increase in the number of copies of the IPC protocol distribution in the UNRWA in comparison with study of Abu Zaid, as it was 10% the availability of the IPC protocol in the clinic and 33.8% the IPC protocol was available in the clinic but not seen (Abu Zaid, 2010) But in our study the percentage of the availability of the IPC protocol had increased to 37.5% in UNRWA and 4.1 % in M.O.H.. This is a good indicator for the increasing of compliance in the UNRWA. The availability of the IPC protocol is significantly higher in UNRWA (P-value <0.001) than the M.O.H., thus the M.O.H. should consider the importance to supply the PDHC centers with the IPC protocol copies. (see tables 4.4).

Table (4.4)
Information about availability of IPC protocol and health provider

Question		M.O.H.		UNRWA		Total		X^2 or Fisher test	Sig.
N = 137		No.	%	No	%	No.	%		
Do you have a written copy of the infection prevention control protocol in your clinic	Yes, in "English"	0	0.0	15	37.5	15	10.9	121.517	0.001
	Yes, in "Arabic"	4	4.1	0	0.0	4	2.9		
	Yes, not seen	0	0.0	21	52.5	21	15.3		
	No	90	92.8	4	10.0	94	68.6		
	Don't know	3	3.1	0.0	0.0	3	2.2		
Have you been asked to read it before starting Job	Yes	3	75.0	25	69.4	28	70.0	0.053	0.654
	No	1	25.0	11	30.6	12	30.0		
have you been asked to sign documentation of that	Yes	0	0.0	13	43.3	13	38.2	2.806	0.129
	No	4	100.0	17	56.7	21	61.8		
Availability of the protocol	Present in the shelf of the room where services are provided.	0	0.0	2	6.7	2	5.9	19.335	0.001
	Present in the drawer	4	100.0	0	0.0	4	11.8		
	Present in the cupboard	0	0.0	6	20.0	6	17.6		
	Present in other places	0	0.0	22	73.3	22	64.7		

4.4 Supervision and monitoring

Regarding the presence of a dental supervisor who supervise the DHCPs work ,the majority (98.5%) answered yes, 62.8% demonstrated that they supervise other employees in the clinic (they are dentists and dentists acting as a head of the clinic), and 78.8% of the DHCPs illustrated that they don't have a monitoring system about infection rate in the clinic, only 29 (21.2%) participants answered yes and out of the 29 participants 28 persons (96.6%) said that the findings of the monitoring were used to improve the infection rate in the clinic, they are distributed along 14 PHC dental clinics, as 1 dental clinic of the M.O.H. and the rest 13 dental clinics of the UNRWA , additionally, 96.6% of participants who said that they have a monitoring system in their clinic, they illustrated that their clinic carried out a follow up/supervision of their practice regarding the infection prevention control procedures, Two third (72.4%) of supervisors used observation method, around half (51.7%) of them received a hard copy of the feedback visit from the supervisors regarding the IPC protocol follow up , 88.9% of them said that they used it in improvement their work performance this is in line with (Abu Zaid,2010) discussion on the importance of supervising and monitoring practicing, in a comparison between the M.O.H. and the UNRWA the percentage of participants in M.O.H. who said they have a monitoring system in the clinic was is 2.1% and 67.5% in the UNRWA. Theses determines statistical significant (P-value is 0.001.). Our comment on the results shown in table (no. 4.5) below that there is a need for proper implementation of monitoring system of infection rate in the PDHC centers of the M.O.H. and carry out the follow up/ supervision of practice regarding the infection prevention control procedures by checklist and observation for the DHCPs with written feedback in order to improve the compliance and application of infection rate monitoring system in the M.O.H., PDHC center (see tables no. 4.5).

Table (4.5)

Supervision and monitoring for cross infection in the M.O.H. and UNRWA dental clinics

Question		M.O.H.		UNRWA		Total		X^2 or Fisher test	Sig.
		No.	%	No.	%	No.	%		
Do you have a dental supervisor who supervises your work	Yes	95	97.7	40	100.0	135	98.5	0.837	0.500
	No	2	2.1	0	0.0	2	1.5		
do you supervise other employee in your clinic	Yes	58	59.8	28	70.0	86	62.8	1.262	0.177
	No	39	40.2	12	30.0	51	37.2		
Do you have in use monitoring system about infection rate in your clinic	Yes	2	2.1	27	67.5	29	21.2	72.676	0.001
	No	95	97.7	13	32.5	108	78.8		
Are the findings of monitoring used to improve infection rate in your clinic	Yes	2	100.0	26	96.3	28	96.6	0.077	0.931
	Sometimes	0	0.0	1	3.7	1	3.4		
Has your clinic ever carried out a follow up/supervision of your practice regarding the infection prevention control procedures	Yes	2	100.0	26	96.3	28	96.6	0.077	0.931
	No	0	0.0	1	3.7	1	3.4		
If yes , what are the tools does your supervisor usually use	Checklist	0	0.0	8	29.6	8	27.6	0.818	0.517
	Observation	2	100.0	19	70.4	21	72.4		
did you receive any feedback after your supervisor's visit regarding your IPC practices in the clinic?	Yes, written	0	0.0	15	55.6	15	51.7	Fisher 11.309	0.001
	Yes, Verbal	0	0.0	12	44.4	12	41.4		
	Not At All	2	100.0	0	0.0	2	6.9		
If yes, what do you do with the feedback	Keep it in the files without discussion.	0	0.0	1	3.7	1	3.7	NA	NA
	Discusses it with the concerned people.	0	0.0	2	7.4	2	7.4		
	Use it in the developing improvement strategies.	0	0.0	24	88.9	24	88.9		

4.5 Material availability in the PDHC centers (Refer to the last year)

Field observation for the clinics work was done by the researcher. Results in table (4. 6) shows that there is some shortage in some essential materials such as bleaching agent, towel paper for dental chair, suction tubes, face shield and apron because it is not available in the central stores of pharmacy. This had negative effect on the providing of an acceptable level of client care and disinfection for the equiment, instruments and maintaining the healthy and clean field of work. (Miller, 2014). Bleach was available in 62.5% of the dental clinics, towel paper for dental chairs was available in 64.2% of dental clinics, suction tubes were in 65.7% of dental clinics (not all the units has a saliva ejector or power suction working properly), face mask were in 78.1% of dental clinics, face shield were in 13.9% of dental clinics, these were the essential materials according to the center of disease control, (CDC, 2003), and for apron was available in15.3% in the dental clinics and it was restricted because the dental X-Ray device was not in use in the clinics in M.O.H. or UNRWA, (the dental X-Ray device used to be in use in the dental clinics of both the M.O.H. and the UNRWA previously, but because of safety precaution and the substitution of panoramic x-ray films and the CBCT, it become not available any more). Table (4.6) illustrate that in general there is another statistically significant difference (P-value 0.001) in the material availability between the M.O.H. and the UNRWA as in the UNRWA. There is no shortage of material availability in the UNRWA which increases the DHCPs compliance of the IPC protocol (CDC, 2003; Marks, 2003), unavailability of material in the M.O.H. such as face masks, bleaching agent, towel papers for dental chair which negatively affected the compliance of the DHCPs with the IPC protocol in the PHC dental clinics in the M.O.H. Another reason for non-availability of some items in the dental clinics were political reasons and continuous enclosure of Gaza Strip boundaries which not allow the import of some dental items to Gaza strip as it was illustrated by the dental material supplying stores in the malls and the central pharmacy stores in the M.O.H.. This import restriction is applied for materials such as bleaching agents and alcohol of 98% concentration (see tables 4.6)

Table (4.6)
Material availability based on the outcome of field observation questionnaires for DHCPs in M.O.H. and UNRWA

Question		MOH		UNRWA		Total		X^2 or Fisher test	Sig.
		No.	%	No.	%	No.	%		
Letax Gloves	Always	93	95.9	40	100.0	133	97.1	1.699	0.247
	Sometimes	4	4.1	0	0.0	4	2.9		
	Rarely	0	0.0	0	0.0	0	0.0		
Alcohol	Always	95	97.9	40	100.0	135	98.5	0.839	0.500
	Sometimes	0	0.0	0	0.0	0	0.0		
	Rarely	2	2.1	0	0.0	2	1.5		
Face mask	Always	67	69.1	40	100.0	107	78.1	15.840	0.001
	Sometimes	16	16.5	0	0.0	16	11.7		
	Rarely	14	14.4	0	0.0	14	10.2		
Bleach	Always	45	46.9	40	100.0	85	62.5	34.000	0.001
	Sometimes	22	22.9	0	0.0	22	16.2		
	Rarely	29	30.2	0	0.0	29	21.3		
Plastic bags	Always	93	95.9	40	100.0	133	97.1	1.699	0.247
	Sometimes	4	4.1	0	0.0	4	2.9		
	Rarely	0	0.0	0	0.0	0	0.0		
Towel papers for dental chairs	Always	53	54.6	35	87.5	88	64.2	13.655	0.001
	Sometimes	6	6.2	0	0.0	6	4.4		
	Rarely	38	39.2	5	12.5	43	31.4		
Suction tubes	Always	59	60.8	31	77.5	90	65.7	4.487	0.106
	Sometimes	5	5.2	0	0.0	5	3.6		
	Rarely	33	34.0	9	22.5	42	30.7		
Garbage cans	Always	97	100.0	40	100.0	137	100.	NA	NA
	Sometimes	0	0.0	0	0.0	0	0.0		
	Rarely	0	0.0	0	0.0	0	0.0		
Autoclave	Always	97	100.0	40	100.0	137	100.0	NA	NA
	Sometimes	0	0.0	0	0.0	0	0.0		
	Rarely	0	0.0	0	0.0	0	0.0		
Dry heat oven	Always	4	4.1	2	5.0	6	4.4	0.052	0.566
	Sometimes	0	0.0	0	0.0	0	0.0		
	Rarely	93	95.9	38	95.0	131	95.6		
Plastic paper to wrap instrument	Always	88	90.7	40	100.0	128	93.4	Fisher 3.972	0.137
	Sometimes	3	3.1	0	0.0	3	2.2		
	Rarely	6	6.2	0	0.0	6	4.4		
Lab coats	Always	97	100.0	40	100.0	137	100	NA	NA
	Sometimes	0	0.0	0	0.0	0	0.0		
	Rarely	0	0.0	0	0.0	0	0.0		
Face shield	Always	17	17.5	2	5.0	19	13.9	9.201	0.010
	Sometimes	10	10.3	0	0.0	10	7.3		
	Rarely	70	72.2	38	95.0	108	78.8		
Apron	Always	9	9.3	12	30.0	21	15.3	10.842	0.004
	Sometimes	5	5.2	0	0.0	5	3.6		
	Rarely	83	85.6	28	70.0	111	81.0		
Cabinet for storage	Always	95	97.9	40	100.0	135	98.5	0.837	0.658
	Sometimes	1	1.0	0	0.0	1	0.7		
	Rarely	1	1.0	0	0.0	1	0.7		

4.6 Reasons for material shortage

Based on the opinions of 47.4 % of DHCPs, tables (4.7) show that the major reason for material shortage was the existence of inadequate material in the central store 47.4% (67.0% in the M.O.H. and 0.0% in the UNRWA) . This could be referred to the political separation between Gaza Strip and West Bank, the presence of the Israeli occupation and financial difficulties as it was discussed previously. The differences in opinions between M.O.H. and UNRWA DHCPs were highly significant for the UNRWA (P- value < 0.001). (see tables no. 4.7)

Table (4.7)
DHCPs' opinions on the reasons for material shortage in M.O.H. and UNRWA

	M.O.H.		UNRWA		Total		Fisher test	Sig.
	No.	%	No.	%	No.	%		
Inadequate material in the central store	65	67.0	0	0.0	65	47.4	137.000	0.001
Increased load	1	1.0	0	0.0	1	0.7		
Inaccurate estimation of the needed material	4	4.1	0	0.0	4	2.9		
Management problems in ordering the material	1	1.0	0	0.0	1	0.7		
All of them	26	26.8	0	0.0	26	19.0		
Others, no shortage	0	0.0	40	100.0	40	29.2		
Total	97	100.0	40	100.0	137	100.0		

4.7 DHCPs views on IPC protocol

Table (4.8) demonstrates that three quarters (75.9%) of the DHCPs believed that the IPC protocol protects the community of cross infection. While DHCPs who believed that the IPC protocol protects the clients live were only 1.5% of the whole participants, which is in a consistence with the IPC protocol (WHO, 2007; CDC, 2003; infection control recommendation for the dental office and the dental laboratory, 1996), there is a statistical significant difference (P-value 0.012) between both of the M.O.H. and the UNRWA DHCPs view as 67.0% of the DHCP in the M.O.H. agree with the statement of saving the community while more DHCPs from UNRWA (97.5%) agreed with this statement as shown in table below. (See tables 4.8)

Table (4.8)
DHCPs' views on IPC protocol in M.O.H. and UNRWA

	M.O.H.		UNRWA		Total		Fisher test	Sig.
	No.	%	No.	%	No.	%		
Save the community.	65	67.0	39	97.5	104	75.9		
IPC protocol improves quality of health.	11	11.3	1	2.5	12	8.8		
Save health workers.	9	9.3	0	0.0	9	6.6		
Save client lives.	2	2.1	0	0.0	2	1.5	14.655	0.012
Others	1	1.0	0	0.0	1	0.7		
Don't know	9	9.3	0	0.0	9	6.6		
Total	97	100.0	40	100.0	137	100.0		

4.8 DHCPs views on the importance of IPC practice

Table (4.9) illustrates that all the DHCPs announced that IPC practices are essential for themselves DHCPs which illustrates that the knowledge for cross infection control among the DHCPs was adequate, 98.5% of the DHCPs agreed with the importance of wrapping instrument as tightly as possible before autoclaving, 99.3% said it's not acceptable not to change gloves between patients even when gloves are in short supply, and this is supported by the CDC recommendations (CDC, 2003). This was obvious in the following questions which reveals what standard precautions means for the DHCPs, 98.5% refused the idea that waste containers can be used for other purposes if they are washed with 0.5% chlorine solution, 97.1% refused the statement that say IPC practices decreases the creditability at work, These results are different from the results of previous study conducted by Abu Zaid, (2010) which demonstrated that 97.5% agree with the statement of decreasing credibility at work by IPC practicing. More DHCPs in the current study (96.4% of the participants) refused the statement which assumes that glass container that contains toxic substances can be washed to be reused, in comparison with 76.3% of DHCPs refused the same statement in previous study .This indicate an increased knowledge of the IPC practice.

For the statement about decontamination solution should be changed every other day 70.8% of the participants refused the sentence, 61.9 % of them were from the M.O.H., while 92.5% of them were from UNRWA and these differences were highly statistical

significant (P-value < 0.0001) as clarified in table (4.9). This can be attributed to the differences in the decontamination solution used in both agencies as the cidex for the M.O.H. is changed every 1-2 weeks while for the UNRWA the chlorine 0.5% is more preferable and should be changed every day. Another statistical significant differences has been found between the views of DHCPs in the M.O.H. and UNRWA, when 60.4% of M.O.H. DHCPs disagreed with the sentence " The time for autoclaving unwrapped instruments is 20 minutes.", while less participants of the UNRWA (40.0%) disagreed with the same sentence (see tables 4.9).

Table (4.9)
DHCPs' views on the importance of IPC protocol practices in M.O.H. and UNRWA

Question		**M.O.H.**		**UNRWA**		**Total**		**X^2**	**Sig.**
Total No. of the participants = 137		**No.**	**%**	**No.**	**%**	**No.**	**%**		
IPC practices are essential for dental health care provider	Yes	97	100.0	40	100.0	137	100	NA	NA
	No	0	0.0	0	0.0	0	0.0		
	DK	0	0.0	0	0.0	0	0.0		
IPC practices decrease the creditability at work.	Yes	4	4.1	0	0.0	4	2.9	1.699	0.247
	No	93	95.9	40	100	133	97.1		
	DK	0	0.0	0	0.0	0	0.0		
Decontamination solution should be changed every other day	Yes	37	38.1	3	7.5	40	29.2	12.865	0.001
	No	60	61.9	37	92.5	97	70.8		
	DK	0	0.0	0	0.0	0	0.0		
Sterilization doesn't kill all microorganisms including bacterial endospores	Yes	6	6.2	0	0.0	6	4.4	3.042	0.218
	No	90	92.8	40	100	130	94.9		
	DK	1	1.0	0	0.0	1	0.7		
Waste containers can be used for other purposes if they are washed with 0.5% chlorine solution.	Yes	2	2.1	0	0.0	2	1.5	0.837	0.500
	No	95	97.9	40	100	135	98.5		
	DK	0	0.0	0	0.0	0	0.0		
Wrap instrument as tightly as possible before autoclaving.	Yes	95	97.9	40	100	135	98.5	0.837	0.500
	No	2	2.1	0	0.0	2	1.5		
	DK	0	0.0	0	0.0	0	0.0		
The time for autoclaving unwrapped instruments is 20 minutes.	Yes	32	33.3	12	30.0	44	32.4	14.293	0.001
	No0	58	60.4	16	40.0	74	54.4		
	DK	6	6.3	12	30.0	18	13.2		
If gloves are in short supply it is acceptable not to change gloves between clients.	Yes	1	1.0	0	0.0	1	0.7	0.415	0.708
	No	96	99.0	40	100	136	99.3		
	DK	0	0.0	0	0.0	0	0.0		
Glass container that contains toxic substances can be washed and rinsed and reused.	Yes	5	5.2	0	0.0	5	3.6	2.140	0.173
	No	92	94.8	40	100	132	96.4		
	DK	0	0.0	0	0.0	0	0.0		

4.9 DHCPs familiarity with the concept of IPC standard precaution

The majority (98.5%) of the DHCPs were familiar with the concept of IPC standard precaution, 55.5% of the DHCPs in this study said that they had the university and workshop as source of knowledge of the IP protocol of cross infection and only 0.7% of the DHCPs used books as sources for cross infection control protocol knowledge, which in line with the view of (McCarthy, et.al., 1999) who said that infection control are not a fixed methods or procedures but are dynamic full of new practices as the science advances, and all DHCP should be kept up to date to prevent the transmission of infection. So by understanding the way of cross infection, dental personnel will reduce the probability of getting the infection and prevent the disease transmission.

The result of the current study shows that 58.1% of the DHCPs felt that the standard precaution means for them as a system of barrier, a standard of care and a system assume that all clients and all body fluids are contaminated all the time, , which is in an agreement with the CDC definition of cross infection control measures (Cherney, 2013; Senagore, A. J., 2004 ;CDC, 2003). These standard precaution components are hand washing, gloves use, physical barrier use, clean environment, sterilization and the usage of high level disinfectant solution as all the DHCPs (100%) agreed that these are the components of standard precaution, as illustrated in table (4.10). Table 4.18 shows a statistically significant differences (P-value is 0.027) between the DHCPs in the M.O.H. and those in the UNRWA in understanding the meaning of standard precaution for DHCPs.(see tables 4.10 and 4.11)

Table (4.10)
DHCPs' familiarity with the concept of IPC standard precaution

	No.	%
Familiar with the concept of IPC standard precaution		
Yes	135	98.5
No	2	1.5
Total	**137**	**100.0**
what is the source of your knowledge of IPC protocol of cross infection		
University & work shop	76	55.5
University	46	33.6
Work shop"	7	5.1
Internet	6	4.4
Books	1	0.7
Don't know	1	0.7
Total	**137**	**100.0**
In your opinion what does standard precaution means to you?		
All of them.	79	58.1
They are the standards of care.	33	24.3
They assume that all clients and all body fluids are contaminated all the time.	17	12.5
Represents a system of barrier precautions to be used by all personnel.	6	4.4
Don't know	1	.7
Total	**136**	**100.0**
What are the main components of standard precautions? choose all the applicable answers		
Hand washing.	0	0.0
Gloves use.	0	0.0
Other physical barriers (including chemical processes).	0	0.0
Prevention of injuries from sharps.	0	0.0
Environmental cleanliness and waste disposal.	0	0.0
Instrument processing (decontamination, cleaning, high- level disinfection, sterilization.	0	0.0
All of Them	137	100.0
Total	**137**	**100.0**

Table (4.11)
Comparison of DHCPs' familiarity with the concept of IPC standard precaution in M.O.H. and UNRWA

Question		M.O.H.		UNRWA		Total		X^2	Sig.
N = 137		No.	%	No.	%	No.	%		
Familiar with the concept of IPC standard precaution	Yes	95	97.9	40	100	135	98.5	0.837	0.500
	No	2	2.1	0	0.0	2	1.5		
what is the source of your knowledge of IPC protocol of cross infection	University	35	36.1	11	27.5	46	33.6	2.912	0.744
	Work shop"	5	5.2	2	5.0	7	5.1		
	Conferences	0	0.0	0	0.0	0	0.0		
	Internet	3	3.1	3	7.5	6	4.4		
	Books	1	1.0	0	0.0	1	0.7		
	University & work shop	52	53.6	24	60.0	76	55.5		
	Don't know	1	1.0	0	0.0	1	0.7		
In your opinion what does standard precaution means to you	Represents a system of barrier precautions to be used by all personnel.	3	3.1	3	7.5	6	4.4	10.963	0.027
	They are the standards of care.	29	30.2	4	10.0	33	24.3		
	They assume that all clients and all body fluids are contaminated all the time.	8	8.3	9	22.5	17	12.5		
	All of them.	55	57.3	24	60.0	79	58.1		
	Don't know	1	1.0	0	0.0	1	0.7		

4.10 Impact of the IPC protocol on DHCPs' Practice

Majority (96.4%) of the DHCP participants said that the IPC protocol influences their practice to high extent improvement, which is higher influence compared to the results of Abu Zaid,(2010), which illustrated that 61.2% of the study population agreed that the use of IPC protocol influence their practice to high extent. In addition the below answer is based on questions which are recycled from the publications of (Oosthuysen, 2010; Wanessa, 2009; Qudeimat, 2006; Adebola, Foluso, 2004; Adrian, 1999) were the 94.2% of

the DHCP who participated in this study said that they regularly assessing the client medical history before providing care for them, but only 65.7% of participants documented each client condition regarding infection or infectious diseases in the client medical file. It found that (51.5% of DHCPs in the M.O.H. and 100% of DHCPs in the UNRWA documented client conditions, because of the use of E-health, computerized electronic medical record, in the UNRWA the documentation of client conditions is significantly higher (P-value is 0.001) than that of M.O.H. and 61.3% of the participants requested the patients to get their health record before starting their treatment as illustrated in table (4.12).Table (4.13) showed that these practices are more in UNRWA compared to M.O.H. and these differences are statistically significant (P-value 0.001). This focuses the light on the importance of documentation of the patients' conditions in their medical health record specially in the M.O.H.

Returning to table (4.12) the majority of the DHCPs (96.4%) illustrated that the IPC protocol is in use in their working clinics, in a comparison to 50.0% in Abu Zaid,2010 study, who said in her study that the DHCPs used the IPC protocol in the clinic in a percentage of 50.0%.

Approximately 64.2% of the total participants agreed that IPC protocol is a friendly user to high extent, which is similar to the results of the previous study done by Abu Zaid (2010), which illustrated that the easiness of use of the IPC protocol practice of DHCPs was illustrated to high extent by 61.2%. Three quarter (75.2%) of the DHCPs in the consistent study had noticed few obstacles in applying the IPC protocol ,and 59.1% of DHCPs mentioned working over load as a main obstacle in using IPC protocol. This issue has a statistically significant effect (P-value is 0.001) on more UNRWA employees (70.0%) compared to M.O.H. employees (54.6%).

In table (4.12) among the 56 DHCPs who worked in a private clinics in addition to their job in the M.O.H. or the UNRWA 92.9% of them said they always practice IPC protocol in their private clinic, 37.2% of the DHCPs said their opinion was good (51.5% of DHCPs in M.O.H. and 2.5% of DHCPs in UNRWA) about the compliance with the IPC protocol practice ,35.8% of the DHCPs said that the compliance with the IPC protocol practice is excellent (77.5% of the DHCPs in UNRWA said it's excellent mean while 18.6% of the DHCPs in M.O.H. said that), 24.8% of the DHCPs said compliance with IPC protocol was very good and 2.2% of the DHCPs said it was bad , there were statistical significant

difference in the opinion about compliance with the IPC protocol between DHCPs in M.O.H. and UNRWA ,(P-value 0.001) which is strongly statistical significant.

The results also illustrated that 75.9% of the DHCPs thought that their professional position give them the possibility of contributing in the updating of the IPC protocol (see tables no.4.12 and 4.13)

Table (4.12)

Impact of the IPC protocol on DHCPs practices

	No.	**%**
How does the IPC protocol influence your practice at the clinic		
Improve practice to high extent	132	96.4
Improve practice to some extent	5	3.6
Total	**137**	**100.0**
Do you usually assess the client medical history regarding the IPC before caring for them?		
Regularly	129	94.2
Sometimes	8	5.8
Total	**137**	**100.0**
Do you document each client condition regarding infection or infectious diseases in the client file regardless to the number of visits he paid		
Yes	90	65.7
No	47	34.3
Total	**137**	**100.0**
Does each patient seeking dental care treatment is requested to get his health record as starting, wither he has infectious disease or not		
Yes	84	61.3
No	53	38.7
Total	**137**	**100.0**
Is the IPC protocol in use in the clinic you work at		
Always	132	96.4
Sometimes	5	3.6
Total	**137**	**100.0**
If used, are they friendly user?		
Yes, to high extent	88	64.2
Yes, to some extent	49	35.8
Total	**137**	**100.0**

Table (4.12) ***Continue***

Impact of the IPC protocol on DHCPs practices

	No.	**%**
Have you noticed any obstacles in using the IPC protocol		
Yes, many	6	4.4
Yes, few	103	75.2
Not at all	28	20.4
Total	**137**	**100.0**
What are the main obstacles in using the IPC protocol? Choose all the applicable answers		
Work overload	81	59.1
Lack of time	8	5.8
Poor follow up from the clinic	6	4.4
Insufficient training	5	3.6
Insufficient knowledge	2	1.5
All of the above	18	13.1
No obstacles	17	12.4
Total	**137**	**100.0**
Do you practice the IPC protocol practices in your private clinic		
Yes always	52	92.9
Sometimes	2	3.6
Never	2	3.6
Total	**56**	**100.0**
What is your opinion about DHCP compliance with the IPC protocol in M.O.H. and UNRWA?		
Excellent	49	35.8
Very good	34	24.8
Good	51	37.2
Bad	3	2.2
Total	**137**	**100.0**
Does your professional position give you the possibility of contributing in the updating of the IPC protocol		
Yes	104	75.9
No	30	21.9
Don't Know	3	2.2
Total	**137**	**100.0**

Table (4.13)

Comparison of impact of the IPC protocol on DHCPs practices in the M.O.H. and UNRWA

		M.O.H.		UNRWA		Total		X^2	Sig.
		No.	%	No.	%	No.	%		
How does the IPC protocol influence your practice at the clinic	Improve practice to high extent	92	94.8	40	100	132	96.4	2.140	0.173
	Improve practice to some extent	5	5.2	0	0.0	5	3.6		
Do you usually assess the client medical history regarding the IPC before caring for them?	Regularly	91	93.8	38	95.0	129	94.2	0.072	0.572
	Sometimes	6	6.2	2	5.0	8	5.8		
Do you document each client condition regarding infection or infectious diseases in the client file regardless to the number of visits he paid	Yes	50	51.5	40	100	90	65.7	29.503	0.001
	No	47	48.5	0	0.0	47	34.3		
Does each patient seeking dental care treatment is requested to get his health record as starting, wither he has infectious disease or not	Yes	45	46.4	39	97.5	84	61.3	31.187	0.001
	No	52	53.6	1	2.5	53	38.7		
Is the IPC protocol in use in the clinic you work at	Always	92	94.8	40	100	132	96.4	2.140	0.173
	Sometimes	5	5.2	0	0.0	5	3.6		
If used, are they user friendly?	Yes, to high extent	65	67.0	23	57.5	88	64.2	1.115	0.194
	Yes, to some extent	32	33.0	17	42.5	49	35.8		
Have you noticed any obstacles in using the IPC protocol	Yes, many	6	6.2	0	0.0	6	4.4	3.050	0.218
	Yes, few	73	75.3	30	75.0	103	75.2		
	Not at all	18	18.6	10	25.0	28	20.4		

Table (4.13) *Continue*

Comparison of impact of the IPC protocol on DHCPs practices in the M.O.H. and UNRWA

		M.O.H.		UNRWA		Total		X^2	Sig.
		No	%	No.	%	No.	%		
What are the main obstacles in using the IPC protocol? Choose all the applicable answers	Insufficient knowledge	0	0.0	2	5.0	2	1.5	Fisher 23.654	0.001
	Insufficient training	5	5.2	0	0.0	5	3.6		
	Poor follow up from the clinic	6	6.2	0	0.0	6	4.4		
	Work overload	53	54.6	28	70.0	81	59.1		
	Lack of time	7	7.2	1	2.5	8	5.8		
	All of the above	18	18.6	0	0.0	18	13.1		
	No obstacles	8	8.2	9	22.5	17	12.4		
Do you have private clinic	Yes	46	47.4	10	25.0	56	40.9	5.892	0.012
	No	51	52.6	30	75.0	81	59.1		
Do you practice the IPC protocol practices in your private clinic	Yes always	42	91.3	10	100	52	92.9	Fisher 0.936	0.626
	Sometimes	2	4.3	0	0.0	2	3.6		
	Never	2	4.2	0	0.0	2	3.6		
What is your opinion about DHCP compliance with the IPC protocol in M.O.H.& UNRWA	Excellent	18	18.6	31	77.5	49	35.8	47.577	0.001
	Very good	26	26.8	8	20.0	34	24.8		
	Good	50	51.5	1	2.5	51	37.2		
	Bad	3	3.1	0	0.0	3	2.2		
Does your professional position give you the possibility of contributing in the updating of the IPC protocol.	Yes	67	69.1	37	92.5	104	75.9	9.439	0.009
	No	28	28.9	2	5.0	3	2.2		
	Don't Know	2	2.1	1	2.5	3	2.2		

4.11 DHCPs comments on the IPC protocol (results from the self-administered questionnaire data analysis).

Table (4.14) shows that 83.9% of the DHCPs agreed that the IPC protocol is not suitable for the dental clinic practicing and needs modification, and this is supported with what it was mentioned in the literature review previously, that IPC protocol needs updating every two years and the protocol itself is general not specific for dentistry (The Palestinian IPC protocol, 2004), as it ignores the basics of IPC practicing regarding the contra angle hand piece and the high speed turbine, the procedures for handling the lights in the dental chair and the optimum method for handling the air compressor and the place that it should be positioned .

The most important actions which are needed to increase the dentists and all the DHCPs' compliance with the IPC protocol is a group of recommendations, including training courses ,bounces and punishment ,monthly assessment and the availability of enough material, which were recommended by 75.2% of the DHCPs.

From the data analysis there were 93.4% of the participated DHCP illustrated that there is an assigned person for ensuring the staff compliance to IPC protocol application in their work place, while 6.6% of the study population said there is no any person assigned for that, similarly 92.7% of the DHCPs said there is no any list of daily procedures to ensure the compliance of the IPC protocol in the clinics. In table no.4.22 we can see that the list is only available in one PHC clinic in the M.O.H. which is the Mograqa and in 5 PHC clinics in the UNRWA, and they are Khan-Younis Alyabaniya, Ma'an, Al-Shat'I, Al-Magazi and Al-Bureij. As also in table (4.21) we can see that 62.0% of the DHCPs said that the head of clinic is the person who check the daily compliance of the IPC protocol practicing in the PHC dental clinics in both the M.O.H. and UNRWA , while 29.2% of them stated that the head of nurses is the person who is responsible for the daily check of the compliance with the IPC protocol practicing in the PHC dental clinics.

All of the DHCPs who participated in the research (100%) agreed that there is neither needle stick protocol nor post exposure program to be implemented in the IPC protocol which should be updated every 2 years. In addition, all (100%) of the DHCPs agreed that there is no mechanism to document the exposure incidence, 94.2% of the DHCPs performed hand hygiene before and /or after treating patients, 92.0% of them answered that alcohol hand rub and swab is available, 75.2% of the staff are properly trained on the use

of alcohol hand rub and swab products and this is in a harmony with the study of (Molinari and Harte, 2010) which said that routinely hand hygiene and sterilization of instruments can secure the adequate infection control in dental care practices, but unfortunately 96.3% of the participants in the questionnaire answered that there is no list for what surfaces should be cleaned, disinfected or barrier protected and the process and the products to be used.

Finally 83.9% of the participated DHCPs agreed that there is a protocol for the chemical disinfectants explains how to be used, managed, stored and disposed. This is as recommended by (Anon.,1996) in his study. Table (4.22) illustrated that there were statistical significant differences (P-value 0.04) between the DHCPs in the M.O.H. and UNRWA, about the presence of assigned person to insure the staff compliance in the work place, and also another statistical significant difference (P-value 0.001) about the presence of list of daily procedures required to insure the IPC compliance in the clinic, additionally a significant differences were (P-value < 0.0001) between the DHCPs in the M.O.H. and the UNRWA , regarding the presence of protocol for chemical disinfectants to be used, how they are managed, stored and disposed (see tables 4.14 and 4.15) .

Table (4.14)

DHCPs comments on the IPC protocol (results from the self-administered questionnaire data analysis)

	No.	%
Is the IPC protocol suitable for dental clinics or need a modification to be suitable for dental practice		
Suitable	22	16.1
Need modification	115	83.9
Total	**137**	**100.0**
In your opinion what are the most important action needed to increase the dentist DHCP compliance with the IPC protocol		
Training courses	24	17.5
Monthly assessment	2	1.5
Bounces & punishment	7	5.1
Availability of enough material	1	.70
All of the above"	103	75.2
Total	**137**	**100.0**
Is there assigned person for ensuring staff compliance in your work place		
Yes	128	93.4
No	9	6.6
Total	**137**	**100.0**
Is there a list of daily procedures required to insure IPC compliance in		
Yes	10	7.3
No	127	92.7
Total	**137**	**100.0**
Who check daily compliance with it		
Head of the clinic	85	62.0
Head of nurses	40	29.2
No one	12	8.8
Total	**137**	**100.0**
Are there a "needle stick" protocol and post exposure program		
Yes	0	0.0
No	137	100.0

Table (4.14) ***Continue***

DHCPs comments on the IPC protocol (results from the self-administered questionnaire data analysis)

	No.	**%**
Total	**137**	**100.0**
Is there a mechanism to document the exposure incident		
Yes	0	0.0
No	135	100.0
Total	**135**	**100.0**
Do DHCP perform hand hygiene before and / or after treating patients		
Yes	129	94.2
No	8	5.8
Total	**137**	**100.0**
Is alcohol hand rub or alcohol swab available		
Yes	126	92.0
No	11	8.0
Total	**137**	**100.0**
Are the staff properly trained in the use of alcohol hand rub products		
Yes	103	75.2
No	34	24.8
Total	**137**	**100.0**
Are there a list for what surfaces will be cleaned , disinfected or barrier protected and the process and products to be used		
Yes	5	3.7
No	131	96.3
Total	**136**	**100.0**
If chemical disinfectants are to be used, is there a protocol for how they are managed, stored and disposed		
Yes	115	83.9
No	22	16.1
Total	**137**	**100.0**

Table (4.15)
Comparison of DHCPs comments on the IPC protocol (results from the self-administered questionnaire data analysis) in M.O.H. and UNRWA

		M.O.H.		UNRWA		Total		X^2	Sig.
		No.	%	No.	%	No.	%		
Is the IPC protocol suitable for dental clinics or need a modification to be suitable for dental practice	Suitable	12	12.4	10	25.0	22	16.1	3.351	0.061
	Need modificatio n	85	87.6	30	75.0	115	83.9		
In your opinion what are the most important action needed to increase the dentist DHCP compliance with the IPC protocol	Training courses	14	14.4	10	25.0	24	17.5	6.489	0.165
	Monthly assessment	1	1.0	1	2.5	2	1.5		
	Bounces & punishment	3	3.1	4	10.0	7	5.1		
	Availability of enough material	1	1.0	0	0.0	1	0.7		
	All of the above"	78	80.4	25	62.5	103	75.2		
Is there assigned person for ensuring staff compliance in your work place	Yes	88	90.7	40	100	128	93.4	3.972	0.040
	No	9	9.3	0	0.0	9	6.6		
Is there a list of daily procedures required to insure IPC compliance in clinic	Yes	2	2.1	8	20.0	10	7.3	13.468	0.001
	No	95	97.1	32	80.0	127	92.7		
Who check daily compliance with it	Head of the clinic	63	64.9	22	55.0	85	62.0	10.232	0.006
	Head of nurses	22	22.7	15	45.0	40	29.2		
	No one	12	12.4	0	0.0	12	8.8		
Are there a "needle stick" protocol and post exposure program	Yes	0.0	0.0	0.0	0.0	00	0.0	NA	NA
	No	97	100	40	100	13 7	100		

Table (4.15) *Continue*
Comparison of DHCPs comments on the IPC protocol (results from the self-administered questionnaire data analysis) in M.O.H. and UNRWA

		M.O.H.		UNRWA		Total		X^2	Sig
		No.	%	No.	%	No.	%		
Is there a mechanism to document the exposure incident	Yes	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA
	No	97	100	40	100	135	100		
Do DHCP perform hand hygiene before and after treating patients	Yes	89	91.8	40	100	129	94.2	3.504	0.058
	No	8	8.2	0	0.0	5	8.5		
Is alcohol hand rub available	Yes	86	88.7	40	100	126	92.0	4.932	0.019
	No	11	11.3	0	0.0	11	8.0		
Are the staff properly trained in the use of alcohol hand rub products	Yes	63	64.9	40	100	103	75.2	18.649	0.001
	No	34	35.1	0	0.0	34	24.8		
Are there a list for what surfaces will be cleaned, disinfected or barrier protected and the process and products to be used	Yes	3	2.1	2	5.0	5	3.7	0.280	0.461
	No	93	97.9	38	95.0	132	96.3		
If chemical disinfectants are to be used, is there a protocol for how they are managed, stored and disposed	Yes	75	77.3	40	100	115	83.9	10.808	0.000
	No	22	22.7	0	0.0	22	16.1		

4.12 Comparison on IPC compliance between PHCPs in M.O.H. and UNRWA

4.12.1 Practices and the compliance with IPC Protocol in the health providers.

This is a comparison between the DHCPs in the M.O.H. and the UNRWA in the compliance of the IPC protocol practice, as the DHCPs in the M.O.H. are 97 and 40 in the UNRWA. Based on the observation checklist of practice for the DHCPs and questions in section B- Practice from the self-administered questionnaire, questions number 42,43,44,45and 46 which were used to calculate the mean of compliance, the study found that 79.90 mean of the DHCPs in M.O.H. practices based on cross infection prevention, while 95.42 mean of the DHCPs in UNRWA showed compliance with the IPC protocol in their practice. Mean of compliance in males was 85.98 and higher than that among females which was 82.12 (See table 4.16).

Table (4.16)

Comparison between the M.O.H. and the UNRWA DHCPs on compliance to IPC protocol in practice based on the health provider and gender

	No.	Mean	Std	t	Sig.
Health provider					
M.O.H.	97	79.90	18.2	26.768	0.001
UNRWA	40	95.42	8.4		
Gender					
Male	82	85.98	16.24	1.273	0.205
Female	55	82.12	18.94		

4.12.2 Differences between practicing IPC by governorates

Regarding level of education of DHCPs, the compliance to the IPC protocol in practice was the highest among the Master holder 87.04. As in a comparison between the governorates of Gaza Strip in the compliance of the DHCPs with the IPC protocol, we found that the mean of compliance to IPC protocol in practice was the highest among the DHCPs in Rafah compared to DHCPs in other governorates of Gaza.

Around third of the DHCPs (37.2%) who participated in the study were in the age between 36 to 45, with a compliance mean 84.31, while DHCPs in the age group more than 50 years old had the highest compliance mean 87.50 which is in a harmony with Gillian M.McCarthy study in the hand washing (McCarthy et al, 1999), followed by DHCPs in the age group between 46 to 50 with a compliance mean 85.51, and finally the age group of 35 years and younger were the DHCPs with a compliance mean of 81.43. the overall mean of compliance was 84.42.

The Dental Hygienist category had the highest mean of compliance of the IPC protocol with a 91.67 followed by the Nurses category 88.64 then the Dentist acting as head of department category with 87.30 followed by the dentist category with a mean of compliance 82.31 and finally the Dental Nurse category 77.50. The total mean was 84.42.

ANOVA test and post hock test were used to investigate the differences between IPC practice and some socio-demographic variables among the study population. The results showed that there were no statistical significant differences in the IPC practice and the socio-demographic variables among the study population (see table 4.17). Statistical significant differences was found only in compliance of the IPC practice by governorates

(see tables 4.17 and 4.18) and this significant differences in compliance were only between Gaza and all other governorates. With the differences in the compliance of DHCPs to IPC in the other four governorate were not significant.

Table (4.17)
Comparison between the DHCPs compliance to IPC protocol practice according to socio-demographic distributions

	No	**mean**	**Std**	**F**	**Sig.**
Education					
Bachelor	88	85.23	17.03	0.553	0.577
Diploma	40	82.08	19.02		
Master	9	87.04	13.89		
Total	137	84.42	17.41		
Governorates					
Gaza	58	73.56	17.39	14.945	0.000 1
North Gaza	19	92.99	11.54		
Mid zone	22	87.88	14.71		
Khan-younis	25	92.67	12.80		
Rafah	13	98.72	4.62		
Total	**137**	**84.42**	**17.41**		
Age					
35 Years old	35	81.43	19.71	.6620	0.577
From 36 to 45 Years old	51	84.31	16.13		
From 46 to 50 Years old	23	85.51	16.13		
More than 50 Years old	28	87.50	17.93		
Total	**137**	**84.42**	**17.41**		
Profession					
Dentist acting as head of department	42	87.30	16.38	1.794	0.134
Dentist	49	82.31	17.15		
Nurse	22	88.64	17.36		
Dental Hygienist	4	91.67	16.67		
Dental Nurse	20	77.50	18.95		
Total	**137**	**84.42**	**17.41**		

Table (4.18)
Comparison between the DHCPs compliance to IPC protocol practice by governorates

Post Hoc test

(I) District	(J) District	Mean Difference (I-J)	Std. Error	Sig.	95%Confidence Interval	
					Lower Bound	Upper Bound
1 gaza	2 north gaza	-19.41924-*	3.87552	.000	-30.4838-	-8.3547-
	3 mid zone	-14.31557-*	3.67109	.002	-24.7965-	-3.8347-
	4 khan younis	-19.10345-*	3.50776	.000	-29.1181-	-9.0888-
	5 rafah	-25.15473-*	4.49903	.000	-37.9994-	-12.3101-
2 north gaza	1 gaza	19.41924*	3.87552	.000	8.3547	30.4838
	3 mid zone	5.10367	4.59176	1.000	-8.0057-	18.2131
	4 khan younis	.31579	4.46226	1.000	-12.4239-	13.0555
	5 rafah	-5.73549-	5.27718	1.000	-20.8018-	9.3308
3 mid zone	1 gaza	14.31557*	3.67109	.002	3.8347	24.7965
	2 north gaza	-5.10367-	4.59176	1.000	-18.2131-	8.0057
	4 khan younis	-4.78788-	4.28591	1.000	-17.0241-	7.4483
	5 rafah	-10.83916-	5.12892	.365	-25.4822-	3.8038
4 khan younis	1 gaza	19.10345*	3.50776	.000	9.0888	29.1181
	2 north gaza	-.31579-	4.46226	1.000	-13.0555-	12.4239
	3 mid zone	4.78788	4.28591	1.000	-7.4483-	17.0241
	5 rafah	-6.05128-	5.01332	1.000	-20.3642-	8.2617
5 rafah	1 gaza	25.15473*	4.49903	.000	12.3101	37.9994
	2 north gaza	5.73549	5.27718	1.000	-9.3308-	20.8018
	3 mid zone	10.83916	5.12892	.365	-3.8038-	25.4822
	4 khan younis	6.05128	5.01332	1.000	-8.2617-	20.3642

*. The mean difference is significant at the 0.05 level.

4.13 Checklist results:

4.13.1 Infection prevention and control specific procedures checklist

As seen in the table (4.19) below, the researcher himself observed three times field work for each DHCP to explore the practice of the IPC protocol guidelines at the dental clinics of the PHC centers in the M.O.H. and the UNRWA. The below discussion is about the practicing protective measurements such as wearing gloves, face masks, face-shield and eye-goggles, decontamination of instruments and waste disposing.

The most excellent findings were 100% of total percentage for compliance among the DHCPs in the clinics of both M.O.H. and UNRWA of usage of sharp box (safety box), hot steam sterilization, the housekeeping as the non-client areas were free from dust, dirt and organic waste and lastly disposal of waste. On the other hand, it found that the worst compliance with IPC protocol among the DHCPs in the M.O.H. and UNRWA was in practicing hand washing during their clinical work and its total percentage was 21.7%

This study found that 21.7% of the overall DHCPs participants practicing hand washing during their clinical work, 28.5% of DHCPs in the M.O.H. and 5% of DHCPs in the UNRWA. This is similar to what is illustrated in previous studies and that many dentists don't wash their hands between changing gloves and after removal of gloves (al-Omari, 2005; McCarthy, 1999). But this is not similar to the results collected and declared by the study of Abu Zaid (2010). Which said that the percentage of washing hands between the DHCP was 35.0% which is higher than the results of the current study. All this is based on questions which was recycled from the publications of (Oosthuysen, 2010; Wanessa, 2009; Qudeimat, 2006; Adebola, 2004; Gillian 2000; Adrian, 1999) were the hand washing procedure is an essential step in the infection control and it's the most important step to control and prevent the cross infection (CDC, 2003). The total percentage of compliance of wearing gloves was high as 99.3% of DHCPs wore gloves, (as 99.3% of DHCPs in the M.O.H. and 99.2% of DHCPs in the UNRWA). This indicates a good dental and infection prevention attitude (CDC, 2003). The results of wearing gloves among the DHCPs in this study is higher than the UNRWA study, where it was 76.7% (Abu Zaid,2010). This could be an indicator of an increased IPC practicing and awareness for protecting the DHCP themselves and the patient from cross infection accidents. But there was no utility gloves available to be worn by the DHCPs specially in the steps of decontamination and wrapping the instruments, and also in the dealing with the hard medical wastes.

The total percentage of compliance of DHCPs in wearing the lab coats at the clinic on their duty was 94.2% , as 91.8% of the DHCPs in the M.O.H. and 100% of the DHCPs in UNRWA were wearing their coats. This is a good achievement for the UNRWA Health Department for controlling the workers as in Abu Zaid's (2010) study, which illustrated that 98.3% of the DHCPs in the UNRWA were wearing lab coats. Wearing coats is highly recommended because it protects skin and clothes from saliva and splashes during clinic work (Center for Disease Control and Prevention, 2013; World Health Organization, 2007; CDC, 2004; McCarthy J. E., 2000).

The total percentage of wearing facemask when caring for the clients was 45.3% among all the DHCPs, only 41.2% of the workers in the M.O.H. and 55% of the workers in the UNRWA wore facemask. This is very low and it is in contrary with previous study in UNRWA, Abu Zaid (2010), determined that the wearing of face mask by the DHCPs was 78.3%. In general there is a need for improving the infection protection attitude of wearing face masks and face shield by the DHCPs which has an effect on the protection of both the DHCPs and the patient himself (Annalee Y.,2004; CDC, 2004; McCarthy et.al., 2000).

The total percentage of using dental mirror during dental examination process and changing it between every single patient was 65.7% among the DHCPs, (68% of the DHCPs in the M.O.H. and 60% of the DHCPs in the UNRWA).

The total percentage of compliance of the use of antiseptic and disinfectants was 78.8% for processing items for reuse. There was 70.1% total percentage of compliance among the DHCPs in the M.O.H. and 100% total percentage of compliance among the UNRWA DHCPs with a statistically significant difference (P-value 0.001).

An excellent compliance was in the usage of sharp box (safety box) as100% of the DHCPs in both the M.O.H. and the UNRWA disposed needles in the puncture resistant containers and these safety boxes are available whenever sharp instruments are used.

The decontamination of the instruments including the use of cleaning soft brush and detergent, rinsing in running water before drying and sterilization, decontamination of instruments as recommended by (CDC, 2003) was applied by 96.4% of all the DHCPs, as chlorine 0.5% was used in the UNRWA and cidex in the M.O.H. It was 100% application percentage by the DHCPs in the UNRWA and 94.8% application percentage by the DHCPs in the M.O.H. This was a great increase in the compliance by the DHCPs in the UNRWA in comparison with study conducted by Abu Zaid (2010), as it reported 75.0% compliance of the DHCPs. Also there is a shortage in the numbers of practical dental nurse

in the PHC clinics of the M.O.H. which may explains the reason for the 94.8% compliance by the DHCPs.

The use of hot steam sterilization was 100% in the clinics of both the M.O.H. and the UNRWA, were items are properly packed and dated, this is in a line with the recommendation of the Centre of Disease Control (CDC, 2003).

The housekeeping as the non-client areas were free from dust, dirt and organic waste, the total percentage of compliance was also 100% by the DHCPs in the clinics of both M.O.H. and UNRWA. The total percentage of compliance with the disposal of waste was 100% among the DHCPs in the PHC clinics in both the M.O.H. and UNRWA. This includes separating of the general waste and the medical waste, burning the hard medical waste and pouring the liquid medical waste down into drain. (see table 4.19).

Table (4.19)
IPC specific procedures checklist results according to protocol or guidelines in M.O.H. and UNRWA

Question		M.O.H.		UNRWA		Total		X^2	Sig.
Number = 411		**No.**	**%**	**No.**	**%**	**No.**	**%**		
Hand washing: Hands are washed when indicated. They are washed with soap under running water, and hands are dried with a clean towel, or tissue paper.	Yes	83	28.5	6	5.0	89	21.7	27.710	0.001
	No	208	71.5	114	95.0	322	78.3		
	NA	0	0.0	0	0.0	0	0.0		
Wearing gloves: Gloves are worn when dealing with blood or other body fluids.	Yes	289	99.3	119	99.2	408	99.3	0.025	0.646
	No	2	0.7	1	0.8	3	0.7		
	NA	0	0.0	0	0.0	0	0.0		
Lab coats are worn by DHCP at the clinic on their duty.	Yes	267	91.8	120	100	387	94.2	10.511	0.001
	No	24	8.2	0	0.0	24	5.8		
	NA	0	0.0	0	0.0	0	0.0		
Facemask is worn by the dentist when caring for the clients	Yes	120	41.2	66	55.0	186	45.3	6.496	0.007
	No	171	58.8	54	45.0	225	54.7		
	NA	0	0.0	0	0.0	0	0.0		
Dental mirror which is used for dental treatment is changed between every patient.	Yes	198	68.0	72	60.0	270	65.7	2.438	0.075
	No	93	32.0	48	40.0	141	34.4		
	NA	0	0.0	0	0.0	0	0.0		
Antiseptics and disinfectants:Disinfection is used only for processing items for reuse. Antiseptic and disinfectant solutions are handled in a manner that reduces risk of contamination.	Yes	204	70.1	120	100	324	78.8	45.510	0.001
	No	24	8.2	0	0.0	24	5.8		
	NA	63	21.6	0	0.0	63	15.4		

Table (4.19) ***Continue***

IPC specific procedures checklist results according to protocol or guidelines in M.O.H. and UNRWA

Question		M.O.H		UNRWA		Total		X^2	Sig.
Number = 411		**No.**	**%**	**No.**	**%**	**No.**	**%**		
Use of sharp boxes (safety box) : Needles are effectively disposed of in the puncture resistant containers. Sharp boxes are available whenever sharps are used	Yes	291	100	120	100	411	100	NA	NA
	No	0	0.0	0	0.0	0	0.0		
	NA	0	0.0	0	0.0	0	0.0		
Decontamination of instruments: Chlorine 0.5% is used to decontaminate them after their use. They are cleaned using a soft brush and detergent. They are rinsed with water before sterilization or high level disinfection, then dried before sterilization.	Yes	276	94.8	120	100	396	96.4	6.420	0.005
	No	15	5.2	0	0.0	15	3.6		
	NA	0	0.0	0	0.0	0	0.0		
Sterilization: For steam and dry heat sterilization. Items are properly packed and dated for one week (for steam heat sterilization), and for every day (for dry heat sterilization), so that steam reaches all surfaces.	Yes	291	100	120	100	411	100	NA	NA
	No	0	0.0	0	0.0	0	0.0		
	NA	0	0.0	0	0.0	0	0.0		
Housekeeping: The non-client areas are free of dust, dirt and organic waste. The client areas are cleaned with disinfectant solutions. Housekeeping equipment like mops, buckets and clothes, are kept clean and dry, and stored properly.	Yes	291	100	120	100	411	100	NA	NA
	No	0	0.0	0	0.0	0	0.0		
	NA	0	0.0	0	0.0	0	0.0		
Disposal of waste: General waste and medical waste are separated. Medical waste is burned or buried properly. Liquid medical waste is poured down into drain. Containers used for medical waste are properly cleaned with disinfectants.	Yes	291	100	120	100	411	100	NA	NA
	No	0	0.0	0	0.0	0	0.0		
	NA	0	0.0	0	0.0	0	0.0		

4.13.2 Infection Prevention and Control Systems and Supplies Checklist

This part of the results is dealing with the IPC protocol regarding the supplies in the clinic. The mean for cleanliness of equipment, surfaces of examination couches was 96.6% as for the total, but it was 100% in the UNRWA and 95.2% in the M.O.H., these differences were statistically significant (P-value is 0.007). There is an increase in the compliance done by the DHCPs in UNRWA in this item as compared to 75.0% of compliance for the same item in the study of Abu Zaid (2010). Mean of paper sheet availability and its replacement after each patient was 86.6% in total (available in 93.3% in UNRWA clinics and 83.8% of the M.O.H. clinics).This also was a good indicator for follow-up of the IPC recommendations and the data relieved by the previous study by Abu Zaid,(2010), as there was no paper sheet available on all the examination couches in the UNRWA dental clinics. There was a statistical significant differences (P-value 0.006) mean availability of paper sheet between the M.O.H. and UNRWA dental clinics. The availability for hand washing supplies was 100% such as water source, a sink, soap bars or liquid soap, towels or tissue paper are available and clearly in use. For alcohol swab availability it was 89.1% of dental clinics (100% of UNRWA and 84.5% of M.O.H. dental clinics), these differences were statistically significant (P-value 0.001) .

Aseptic dressing supplies availability for implementing aseptic dressing techniques (e.g. sterile dressing sets, instruments with expiry dates, antiseptic solutions, sterile wound coverings and sterile gloves) was in 78.8% of the dental clinics. As it was available in 95% of the dental clinics in UNRWA and 72.2% of the dental clinics in the M.O.H.

The Functional sterilization system efficacy for the autoclave is functioning, is clean, is not crowded with items, moisture and timer is not defected and indicator tape is functioning were in 93.4% of the dental clinics,(in 100% of the UNRWA dental clinics and 90.7 % of the M.O.H. dental clinics).This is another improvement in the IPC protocol compliance in the UNRWA as the compliance for the hot steam autoclave functioning well and the availability of indicator tape were in 85.7% of the dental clinics in UNRWA as in the study conducted by Abu Zaid,(2010).

For the Waste disposal system 100% of the dental clinics were had this item system as availability and it is operating properly in both the M.O.H. and the UNRWA, E.g. trash bins were lined with plastic bags and were available in sufficient quantities, they didn't contain sharps or fluids and 29.2% of the waste disposal system were in the trash bags,

which were coloured according to their risk and the international standards. This practice was shown in 100% in UNRWA dental clinics as in the recommendations of (McCarthy, 2000) but unfortunately was not applied in the M.O.H. dental clinics. Thus, we recommend that applying this system in the M.O.H. dental clinics.

Complete availability (100%) for Sharp boxes (safety box) in every room or area where sharps are used. The recommendation of application of fullness of two thirds of their capacity and full sharp boxes are kept in a safe place until being incinerated , was well practiced in both UNRWA and the M.O.H. dental clinics.

Almost 92% of the toilets facilities were clean and free from rubbish. The area surrounding the facilities were also clean and free from rubbish or waste. This was seen in 80% of the toilets in UNRWA and 96.9% of the toilets in the M.O.H. The percentage in the UNRWA is lower than the same percentage in the previous study by Abu zaid (2010), this may be due to the increased number of attending patients, but it should be considered in the follow up of the recommendation of the study.(see table 4.20).

Table (4.20)
IPC systems and supplies checklist results for both M.O.H. and UNRWA dental clinics

Question		M.O.H.		UNRWA		Total		X^2	Sig.
N = 411		No.	%	No.	%	No.	%		
Cleanliness of equipment, Surfaces of examination couches and dressing trolleys	Yes	277	95.2	120	100	397	96.6	5.977	0.007
	No	14	4.8	0	0.0	14	3.4		
	NA	0	0.0	0	0.0	0	0.0		
Paper Sheets: Paper sheets are available	Yes	244	83.8	112	93.3	356	86.6	6.594	0.006
	No	47	16.2	8	6.7	55	13.4		
	NA	0	0.0	0	0.0	0	0.0		
Supplies for hand wash : Supplies as water source, a sink, soap, towels or tissue paper are available and clearly in use.	Yes	291	100	120	100	411	100	NA	NA
	No	0	0.0	0	0.0	0	0.0		
	NA	0	0.0	0	0.0	0	0.0		
Alcohol swabs are available in all rooms where examinations procedures occur.	Yes	246	84.5	120	100	366	89.1	20.838	0.001
	No	45	15.5	0	0.0	45	10.9		
	NA	0	0.0	0	0.0	0	0.0		
Supplies for decontamination: like plastic basins, 0.5% chlorine solution, cleaning brushes are available for use	Yes	219	75.3	120	100.0	339	82.5	35.997	0.001
	No	72	24.7	0	0.0	72	17.5		
	NA	0	0.0	0	0.0	0	0.0		
Aseptic dressing supplies are available (e.g. sterile dressing sets, instruments with expiry dates, antiseptic solutions and sterile gloves).	Yes	210	72.2	114	95.0	324	78.8	26.870	0.001
	No	69	23.7	6	5.0	75	18.2		
	NA	12	4.1	0	0.0	12	2.9		
Functional sterilization system: autoclave is functioning, not crowded.	Yes	264	90.7	120	100	384	93.4	11.917	0.001
	No	27	9.3	0	0.0	27	6.6		
	NA	0	0.0	0	0.0	0	0.0		
Waste disposal system: the system is available and operates Properly.	Yes	291	100	120	100	411	100	NA	NA
	No	0	0.0	0	0.0	0	0.0		
	NA	0	0.0	0	0.0	0	0.0		
waste disposal system , the trash bags are colored according to their risk, international standards.	Yes	0	0.0	120	100	120	29.2	411.000	0.000
	No	219	100	0	0.0	219	70.8		
	NA	0	0.0	0	0.0	0	0.0		
Sharp boxes (safety box) : in every room where sharps are used.	Yes	291	100	120	100	411	100	NA	NA
	No	0	0.0	0	0.0	0	0.0		
	NA	0	0.0	0	0.0	0	0.0		
Toilets of the facility and area surrounding them are clean and free from waste.	Yes	282	96.9	96	80.0	378	92.0	32.889	0.001
	No	9	3.1	24	20.0	33	8.0		
	NA	0	0.0	0	0.0	0	0.0		

Chapter 5: Conclusion and Recommendations

5.1 Conclusion

The general objective of this study is to assess the compliance of dental health care providers with IPC protocol in the PDHC Centers in M.O.H. and UNRWA in the Gaza Strip Palestine, investigate factors influencing this compliance and explore infrastructure for capability to fit the IPC protocol standards. In addition this study aimed to compare the compliance of the DHCPs with the IPC protocol in the dental clinics of both the M.O.H. and UNRWA in all Gaza Strip governorates. This was done through the use of three tools, the first one was a self-administered questionnaire distributed by the researcher himself for 137 DHCPs who participated in the study and completed the questionnaire, the second tool was a checklist of practice observation to assess the DHCP's compliance to IPC protocol practice and the third tool was a checklist of system and supplies of the clinics itself. The response rate for this study was 100%.

The Palestinian IPC protocol had been established and was founded in 2004 in order to be suitable for the Palestinian health needs.

1) The study found that 79.90 % of the DHCPs in M.O.H. practices were based on IPC protocol, while 95.42 % of the DHCPs in UNRWA practices showed compliance with the IPC protocol in their practice

2) The study also showed that there are no statistically significant differences between infection control practice and social and demographic variables.

3) The study revealed that the problem with the compliance of the DHCPs was the training courses which was done randomly, low level of distribution of the IPC protocol copies especially in the PHC centres of the M.O.H., the low level of monitoring system for the infection rate in the clinic especially in the PHC centers of the Palestinian M.O.H. with no feedback after supervision of the IPC practice.

4) The availability of enough materials in UNRWA dental clinics, and IPC protocol distribution in the dental clinics of UNRWA, applying supervision and monitoring system for the DHCPs are the factors influencing the IPC protocol compliance among the DHCPs in UNRWA.

5) In a comparison between the PHCP compliance in the M.O.H. and UNRWA we can see that the compliance among the UNRWA DHCPs is higher than that among the M.O.H. DHCPs.

6) This protocol should be updated every 2 years as recommended. But unfortunately it was not updated even for a single time since its declaration. This study found that 83.9% of the DHCPs decided that the IPC protocol needs modification and it's general and not specific for dental care . unanimously 100.0% confirmed that there is no protocol for medical accidents such as needle stick injury, which calls for discussion of this subject and give it the necessary attention.

7) Dental units infra-structure is capable to fit IPC protocol, as most materials are available to help DHCPs to follow IPC protocol instructions in UNRWA more than it in M.O.H., where there is remarkable shortage in materials.

8) The utility gloves were unavailable in the PHC dental clinics in both the M.O.H. and the UNRWA.

9) The percentage of UNRWA DHCPs who had received training courses on IPC was higher than that of the DHCPs in the M.O.H.

10) Most of the UNRWA's staff have a copy of the IPC protocol compared to minor staff in the Palestinian M.O.H. dental clinics.

11) 5.0% of the DHCPs of the UNRWA wash their hands when necessary against 28.5% of the DHCPs in M.O.H.

12) UNRWA staff more dedicated to wear facemask compared to M.O.H. staff.

13) The majority of the DHCPs of the UNRWA know the importance of the IPC standards for the community compared to 67.0% of the DHCPs of the Palestinian M.O.H.

14) Almost all DHCPs in UNRWA and M.O.H. confirmed their knowledge for IPC protocol meaning and importance.

5.2 Recommendations

The study recommends the following:

1. Creation of the specialized Palestinian IPC protocol for dentistry which is specific for dentistry and allow the DHCPs to participate in that. This should be updated also every two years through an authorized professional committee.
2. Creation of a needle stick protocol or an exposure incident protocol to ensure that the accidental mechanism and the needle stick is clearly controlled by the authority which are responsible for the health and safety of the DHCPs in both the M.O.H. and UNRWA.
3. Distribution of the IPC protocol copies in every PHC dental clinic either as a hard copy (booklet) or soft computerized one especially in the M.O.H., and ensure that these copies are disseminated in an adequate number.
4. Providing periodic training courses of IPC protocol for all the DHCPs which is important for them in order to keep them updated in the field of knowledge of the IPC practice.
5. Activation of the monitoring system of the infection rate in the dental clinics in both the M.O.H. and the UNRWA through supervision of practice by checklist, and feeding back the DHCP with a written copy of the result of the supervision.
6. Providing enough material to overcome its shortage and impact on the compliance with the IPC protocol in the M.O.H., these materials including bleaching agent, towel paper for dental chairs and facemask.
7. Providing enough quantity of the utility gloves for both the M.O.H. and UNRWA, which are to be used when handling contaminated instruments, medical hazards, chemical wastes and when performing housekeeping activity, since the utility gloves were not available in the PHC dental clinics in both the M.O.H. and UNRWA as observed by the researcher himself.
8. Application of the coloured waste disposal system, as the trash bags should be coloured according to their risk and to the international standards in the dental clinics of the M.O.H.

5.3 Research recommendations

This descriptive cross sectional observational study was conducted in the PHC dental clinics of both the Palestinian M.O.H. and UNRWA PHC dental clinics, and as a researcher I recommend to use the study outcome to develop dental IPC protocol and implement it in the M.O.H., UNRWA, NGOs and private sectors dental clinics, in order to have national implementation in this aspect and improvement for IPC.

References

Abhinav, S., Bharathi, M. P., Ajay, B., Sudhanshu, S., et.al. (2011). Knowledge , Attitudes, and Practice Regarding Infection Control Measures Among Dental Students in Central India. *Journal of Dental Education*. 1(75),3421-427

Abichandani, S. J., & Nadiger, R. (2013). Cross-contamination in dentistry: A comprehensive overview. *Chronicles of Young Scientists*, 4(1).

Abu Hamad B. (2015). *Searching the literature*. Gaza, Gaza City, Palestine: Al-Quds University.

Abu Zaid T. (2010). *Compliance of Dental Health Care Provider with Infection Prevention and Control Protocol in the Dental Units at UNRWA Health Centers in Gaza Governorates*. Master degree thesis study. Jerusalem: Al-Quds University, Palestine.

Adebola, F., Foluso, J. O. (2004). Occupational Hazards Among Clinical Dental Staff, *The Journal of Contemporary Dental Practice*. 5 (2).

Adrian, A.B. , Constantin, C. , Nils, S.& Charles J. P. (1999). Infection control practices and compliance to national recommendations among dentists in Romania, *International Dental Journal*. 49 (5), 260–68.

Al-Kishawi, N. (2013). *Compliance of the DHCP in Al-REMAL MARYTER CLINIC of the IPC protocol*, Master degree thesis study. Jerusalem: Al-Quds University, Palestine.

ALNegrish, A., Momani, A. S. A., & Sharafat, F. A. (2008). Compliance of Jordanian dentists with infection control strategies. *International dental journal*,*58* (5), 231-236.

Al-Omari, M. A., & Al-Dwairi, Z. N. (2005). Compliance with infection control programs in private dental clinics in Jordan. *Journal of Dental education*, 69(6), 693-698.

Al-Rabeah, A. (2002). Infection Control in the Dental Sector in Riyadh. *Annual Saudi Medicine*, 22,1-2

American Dental Association (1996). Infection control recommendations for the dental office and the dental laboratory. *Journal of American Dental Association*, 27,672-680.

Anders, P. L., Townsend, N. E., Davis, E. L., & McCall, W. D. (2016). Observed infection control compliance in a dental school: A natural experiment. *American journal of infection control*, 44(9), 153-156.

Annalee, Y., Elizabeth, B.& David, M. (2004). Protecting the Faces of Health Care Workers: Knowledge Gaps and Research Priorities for Effective Protection Against Occupationally-Acquired Respiratory Infectious Diseases. *Occupational Health and Safety Agency for Healthcare in BC*, Report to Change Foundation.

Arjuna, N.B. , Devipriya, B. S., Sumedha, J., Bobby, K. J.& Prem, N. S. (2011). Knowledge and Attitudes About HIV/AIDS of Dental Students from Kuwait and Sri Lanka .*Journal of Dental Education*, 1 (75),4574-581.

Ashford, D. A., Kaiser, R. M., Bales, M. E., Shutt, K., Patrawalla, A., et al. (2003). Planning against biological terrorism: lessons from outbreak investigations. *Emerging infectious diseases*, 9 (5), 515.

Awad, N. (2009). Adherence to infection prevention and control protocols in the neonatal intensive care units in the ministry of health hospitals in Gaza governoraates. Unpublished master's degree thesis study. AL-Quds University, Gaza, Palestine.

Baker, L. (2013). The Gale Encyclopedia of Surgery: A Guide for Patients and Caregivers. *Reference Reviews*

Bommireddy, V. S., Pachava, S., Sanikommu, S., Vinnakota, N. R., Talluri, D., et al. (2016). Infection control measures among dental practitioners in a Southern state of India: A cross-sectional study. *Journal of Indian Association of Public Health Dentistry*, *14*(3), 302.

Casemiro, L.A., Martins, C., Pires, F., Panzeri, H.& Ito, I. Y. (2007). Bacterial, fungal and yeast contamination. *Brazilian Oral Research.* 21(2), 106-111.

Centers of Disease Control (2003). *Guidelines for Environmental Infection control in Health Care Facilities*. Recommendation of CDC and the Healthcare infection Control Practices Advisory and Committee, Atlanta, GA: U.S. Department of Health and Human Services.

CDC (2014). *Causes of mortality among people,* center of disease control . Atlanta.

Centers for Disease Control and Prevention (2003). *A Guidelines for Infection Control in Dental Health-Care Settings*. Atlanta, GA: US Department of Health and Human Services.

Centers for Disease Control and Prevention (2013). *Guidelines for Infection Control in Dental Health-Care Settings.* Recommendation of CDC and the Healthcare infection Control Practices Advisory and Committee, Atlanta, GA: U.S. Department of Health and Human Services.

Cherney, K. (June, 2013). Cross infection [Online], Retrieved Wednesday February 17, 2016, from http://www.healthline.com/health/cross-infection.

David K., Denise, M.& Fariba, Y. (2004). Impact of Underreporting on the Management of Occupational Blood borne Exposures in a Dental Teaching Environment. *Journal of Dental Education*. 1(68), 6614-622.

Duygu, S., Emir, Y., Sevgi, C., Seda, C., et. al. (2009). A Survey of Cross Infection Control Procedures: Knowledge and Attitudes Of Turkish Dentists. *Journal of Applied Oral Science.* 17 (6), 565–69.

ELJEDI, A.&DALO, S. (2014) Compliance with the National Palestinian Infection Prevention and Control Protocol at Governmental Paediatric Hospitals in Gaza Governorates. *Sultan Qaboos University Medical Journal.*14**,** 375-381.

Evelyn, C., Terry, E. H.& Jeffrey, S. K. (2011). Underreporting of Blood borne Exposures in a Dental School Clinic, *Journal of Dental Education*, 75 (4), 544-48.

Gould, D. (2002). Preventing cross-infection. *Nursing times*, 12, 50.

Gupta, N. (2011). Needle Stick injury in Dentistry. *kathamandu University Medical Journal*, 3,208-12.

Helenaura, P. M., Maria, L. R.J., Sheyla, M. A., Laura, H. M., et.al. (2008). Occupational Exposure to Potentially Infectious Biological Material in a Dental Teaching Environment. *Journal of Dental Education*. 72 (10), 1201-08.

Ho, P. L., Tang X. P.& Seto, W. H., (2003). SARS: Hospital Infection Control and Admission Strategies. *Respiratory Supplement*,8, 41-45,November.

Huberman, A. M.& Miles, M. B. (1994). *Qualitative data analysis: An expanded sourcebook*. sage.

Infection Control Recommendation For The Dental Office And The Dental Laboratory. (1996). *Journal of the American Dental Association* .127 (5), 672-82.

Jabareen, Y. (2009). Building a Conceptual Framework: Philosophy, Definitions, and Procedure, *International Institute For Qualitative Methods*, University of Alberta.

James, S. Marks,W.R.M. (2003). *Guidelines for Infection Control in Dental Health Care Settings*. National Center for Chronic Disease Prevention and Health Promotion. Boston, Massachusetts.

Klein, RS, Phelan, JA, Freeman, K, Schable, C, Friedl, GH, Trieger N, et al. (1988). Low occupational risk of human immunodeficiency virus infection among dental professionals. *Journal of Medicine*,318, 86-90.

Kohn, W. G., Collins, A. S., Cleveland, J. L., Harte, J. A., Eklund, K. J., et.al.(2003). Guidelines for infection control in dental health-care settings--2003. *MMWR Recomm Rep, 52* (17), 1-61.

Kuhar, D. T., Henderson, D. K., Struble, K. A., Heneine, W., Thomas, V., et.al. (2013). Updated US Public Health Service guidelines for the management of occupational exposures to human immunodeficiency virus and recommendations for post exposure prophylaxis. *Infection Control & Hospital Epidemiology, 34*(9), 875-892. Retrieved February 24, 2016. from : http://www.jstor.org/stable/10.1086/672271.

Kuzma, J. (1992). *Basic Statistics For The Health Sciences*. USA: Mayfield Publishing Company.

Latham, J. (2016). Leadership +Design=Sustainable Excellence, *Conceptual framework*. Colorado, Organization Design.

MacIntyre, C.R, Cauchemez, S, Dwyer, D. E, Seale, H.& Cheung P. (2009). Face Mask Use and Control of respiratory virus transmission in household. *Continuing medical education(CME)*, 2, 2-11.

MacIntyre, C. R., Cauchemez, S., Dwyer, D. E., Seale, H., Cheung, P., et al. (2009). Face mask use and control of respiratory virus transmission in households. *Emerging infectious diseases,15* (2), 233.

Martin, M.V.(1990). New concepts in cross infection control in dentistry. *Postgraduate Dentistry*, 8-11.

McCarthy, G. M.**,** Jonathan, E. B. **(**2000). A Survey of Final-Year Dental, Medical and Nursing Students: Occupational Injuries and Infection Control .*Journal of Canadian Dental Association.* 66, 561.

McCarthy, G. M.**,** Koval J. J. , MacDonald J. K. & John M. A. (1999). The role of age- and population- based differences in the attitudes, knowledge and infection control practices of Canadian dentists, *Community Dentistry and Oral Epidemiology*, August, 27(4), 298–04

McCarthy, G. M.**,** Koval, J. J. , MacDonald, J. K. (1999). Compliance With recommended infection control procedures among Canadian dentists: Results of a national survey. *American Journal of Infection Control*, 27, 377-84.

McCarthy, G. M.**,** Koval, J. J. , MacDonald, J. K. (1999). Infection Control Practices Across Canada: Do Dentists Follow the Recommendations? *Journal of Canadian Dental Association*. 65, 506-11.

McCarthy, G. M.**,** MacDonald, J. K. (1996). Gender differences in characteristics, infection control practices, knowledge and attitudes related to HIV among Ontario dentists. *Community Dentistry and Oral Epidemiology*, 24 (6)**,** 412–15.

Miller, C. H. (2014). *Infection Control and Management of Hazardous materials for the dental team*. 5th edition, 89-167. St. Louis, Missouri: ELSEVIER, MOSBY.

Miller, CH & Palenik, CJ. (2004). *Infection Control and Management of Hazardous Materials for the Dental Team*. 3rd ed., 87-93. St Louis, Mosby.

Ministry of Health (2004). *Infection Prevention and Control Protocol*, 1st edition, Jerusalem; Palestinian Ministry of Health.

Ministry of Health, department of Human resources development,(2011). Certificate of attending a training course of endodeontic treatment. Gaza (Gaza City): M.O.H.

Ministry of Health. (2014). *Annual Report of the Palestinian Ministry of Health-Gaza Strip 2013*, Gaza: Ministry of Health.

Molinari, JA, Harte, JA.& Cottone's. (2010). *Practical Infection Control in Dentistry*, 3rd ed. Baltimore, Philadelphia: Lippincott, Williams and Wilkens, a Wolters Kluwer business.

Mona M. B., and Tariq A. M. (2006)/ Hand washing and gloving practice among health care worker in medical and surgical wards in a tertiary care center in Riyadh. Saudi Arabia. Taylor & Francis group. *Scandinavian journal of infection diseases*, 38,620-624.

Morison, S., Marley, J., Stevenson, M. & Milner, S., (2008). Preparing for the dental team: investigating the views of dental and dental care professional students, *European Journal of Dental Education*. 12 (1), 23–28.

Morris, E, Hassan, FS, Al Nafisi, A, Sugathan, TN. (1996). Infection control knowledge and practices in Kuwait: a survey on oral health care workers. *Saudi Dental Journal*; 8: 19-26.

Myers, J. E., Myers, R., Wheat, M. E.& Yin, M. T. (2012). Dental Students and Blood borne Pathogens: Occupational Exposures, Knowledge, and Attitudes. *Journal of Dental Education***,** 1 (76), 479-486.

Olivia, Wann, JD, RDA,(2016). Back to basics: Infection control and prevention. *Dental Economics*, September 22.

Oosthuysen, J., Potgieter, E & Blignaut, E. (2010). Compliance with infection control recommendations in South African dental practices: a review of studies published between 1990 and 2007, *International Dental Journal* . 60 (3),181–189.

Organization for Safety and Asepsis Procedures.(2004), *From Policy to Practice: OSAP's Guide to the Guidelines*. Annapolis, Md: Organization for Safety and Asepsis Procedures, 29-38.

OSHA and CDC Guidelines, 2003. *Combining Safety with Infection Control and Prevention for Dentistry*, 4th ed. Atlanta, GA: Organization for Safety, Asepsis and Prevention.

Palestinian Central Berue of Statistics (2013*). National Palestinian Indicators*. Jerusalem: PCBS.

Palestinian Central Berue of Statistics (2016). *Palestinian Census of Palestine 2016.* Ramallah: PCBS.

Palestinian Health Information Center, Ministry of Health (2015). Primary Health Care Centers in Gaza Strip. Gaza: Palestinian Ministry Of Health.

Palestinian Health Information Center (2014). *Annual Report Of Communicable Diseases At Gaza Strip, Gaza:* Ministry of Health.

Palestinian Infection Prevention and Control Protocol, November 2004.

Palestinian Ministry of Health,(2016).*Primary Health Care Centers, Gaza Strip.* Jerusalem: Health Information System, M.O.H.

Pankhurst, C. L., & Coulter, W. A. (2017). *Basic guide to infection prevention and control in dentistry*. John Wiley & Sons.

Pittet, D., (2004). The Low bury lecture: behavior in infection control, *Journal of Hospital Infection,*58 (1), 1–13.

Primary Health Care, Palestinian Ministry Of Health (2015). *The load of work in the primary dental health care clinics in ministry of health, Gaza Strip*, Gaza: Ministry of Health.

Puro, V, Scognamiglio, P & Ippolito, G. (2003). HIV, HBV, or HCV transmission from infected health care workers to patients. *US National Library of Medicine, National Institutes of Health*, 6, 226-68.

Qudeimat, M.A., Farrah, R.Y.& Owais, A.I**.** (2006). Infection control knowledge and practices among dentists and dental nurses at a Jordanian university teaching center, *American Journal of Infection Control*, 34 (4), 218-22.

Raid N.K. (2017). Health Care Providers' Compliance with the Infection Control Practices in Hemodialysis Units- Gaza Governorates. Master degree thesis study. Jerusalem: Al-Quds University, Palestine.

Samaranayake, L. (1993). Rules of infection control.. *International Dental Journal* ,43: 578-84.

Senagore, A. J. (2004). *The Gale Encyclopedia of Surgery: A Guide for Patients and Caregivers; 3-volume set*. Gale.

Schaffer, S. D., et al. (1996). *Infection Prevention and Safe Practice*. New York: Mosby-Year Book.

Schiff, E. R., De Medina, M. D., Kline, S. N., et.al. (1986). Veterans administration cooperative study on hepatitis and dentistry, *Journal of American Dental Association*. 113, 390-396.

Sehulster, L., Chinn, R. Y., Arduino, M. J., Carpenter, J., Donlan, R., Ashford, D., et.al.(2003). Guidelines for environmental infection control in health-care facilities. *Morbidity and mortality weekly report recommendations and reports RR*, *52*(10).

Seyed, M. A., Nima, M., Nastaran, M., Maryam, M. S., Pardis, S. A., et.al. (2011). Iranian Dental Students' Knowledge of Hepatitis B Virus Infection and Its Control Practices. *Journal Dental Education*.75, 1627-34.

Shailee, F. , Kapil, R. , Girish, M.S. , Vikas, F.& Atul, C. (2013). Knowledge and Attitudes about HIV/AIDS of Students in H.P. Government Dental College and Hospital, Shimla, India, *Journal of Dental Education*. 77 (9), 1218-24.

Shareif M. D.,(2011). Compliance with the Infection Prevention and Control Protocol at the Governmental Pediatric Hospitals in Gaza Governorates. Master Degree Thesis study. Al-Quds University, Palestine.

Shaw, K. (2006). The 2003 SARS outbreak and its impact on infection control practices. *Public health*, *120*(1), 8-14.

Sjöström, H. T., Skyman, E., Hellström, L., Kula, M., & Grinevika, V. (2003). Cross-infection prevention, basic hygiene practices and education within nursing and health care in Latvia: a Swedish–Latvian practice development project. *Nurse education today*, *23*(6), 404-411.

Sorasun, R., Aroonwan, L., Piamkamon, V. & Kraisorn, S. (2013). Thai Dental Practitioners' Knowledge and Attitudes Regarding Patients with HIV. *Journal of Dental Education.* 77 (9), 1202-08.

Standards for dental professionals, Standards Guidance. (2005). *General Dental Council*, 37 Wimpole Street London W1G 8DQ.

Stéphane, H., Thomas, V. Perneger & Didier P., (2002). Alcohol-Based Hand rub Improves Compliance With Hand Hygiene in Intensive Care Units, *Jama Internal Medicine*, 162 (9), 1037-43.

Tada, A, Watanabe, M & Senpuku, H. (2014). Factors influencing compliance with infection control practice in Japanese dentists. *International Journal of Occupational Environmental Medicine.*4, 24-31.

UNRWA (2016). *UNRWA Annual Health Report*. Aman, Jordan: UNRWA.

Vikram, S. B.**,** Srinivas, P.**,** Suresh, S.**,** Narayana, R.V.**,** Devaki, T.**,** et.al., (2016). Infection control measures among dental practitioners in a Southern state of India: A cross-sectional study. *Journal of Indian Association of Public Health Dentistry,*14 (3), 302-07.

Wanessa, T. B. , Fernando, B. & Alcyone, A. M. (2009). Infection control Practices among a cohort of Brazilian dentists, *International Dental Journal*. 59 (1), 53–8.

World Health Organization. (2001). *Infections and infectious diseases: a manual for nurses and midwives in the WHO European Region*. Geneva: WHO.

Wikipedia Foundation (2016).*Geography of Gaza Strip* (online),Retrieved march 14, 2016, from https://en.wikipedia.org/wiki/Gaza_Strip.

William, G.K., Jennifer, A.H., Doloris, M.M., AMY, S. C., Jennifer, L. C.& Kathy J. E. (2003). COVER STORY Guidelines for infection control in dental health care settings, *American Dental Association,*135 (1), 33-47.

Wood PR. (1992). Cross infection control in dentistry: *a practical illustrated guide*. London: Wolfe Publishing Ltd.

Annexes

Annex 1**:** Helsinki committee approval letter.

المجلس الفلسطيني للبحث الصحي

Palestinian Health Research Council

تعزيز النظام الصحي الفلسطيني من خلال مأسسة استخدام المعلومات البحثية في صنع القرار

Developing the Palestinian health system through institutionalizing the use of information in decision making

Helsinki Committee

For Ethical Approval

Date: 01/08/2016 **Number:** PHRC/HC/133/16

Name: AMJAD GH. EL-RAYYES **الاسم:** امجد غسان الريس

We would like to inform you that the committee had discussed the proposal of your study about:

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:

Compliance of Dental Health Care Providers with The Infection Prevention and Control Protocol in Gaza Strip

The committee has decided to approve the above mentioned research. Approval number PHRC/HC/133/16 in its meeting on 01/08/2016

و قد قررت الموافقة على البحث المذكور عاليه بالرقم والتاريخ المذكوران عاليه

Signature

Member **Member**

1/8/2016

Chairman

Genral Conditions:-

1. Valid for 2 years from the date of approval.
2. It is necessary to notify the committee of any change in the approved study protocol.
3. The committee appreciates receiving a copy of your final research when completed.

Specific Conditions:-

E-Mail:pal.phrc@gmail.com

Gaza - Palestine غزة - فلسطين

شارع النصر - مفترق العيون

Annex 2: Ethical approval from Palestinian Ministry of Health.

State of Palestine
Ministry of health

دولة فلسطين
وزارة الصحة

التاريخ:18/08/2016

السيد : ناصرالدين رافت مصطفى ابوشعبان حفظه الله
مدير عام بالوزارة/الإدارة العامة لتنمية القوى البشرية - /وزارة الصحة
السلام عليكم ورحمة الله وبركاته ,,,

/ الموضوع/ تسهيل مهمة باحث/ أمجد الريس

التفاصيل //

بخصوص الموضوع أعلاه، يرجي تسهيل مهمة الباحث/ أمجد غسان الريس
الملتحق ببرنامج ماجستير الصحة العامة – مسار علم الأوبئة- كلية الصحة العامة- جامعة القدس أبو ديس بغزة في إجراء بحث بعنوان :-

" Compliance of Dental Health Care Providers with the Infection Prevention and Control Protocol in Gaza Strip "

حيث الباحث بحاجة لتعبئة استبانه من عدد من أطباء الأسنان العاملين في عيادات الأسنان في مراكز الرعاية الأولية وكذلك تعبئة نموذج ملاحظة عن عيادة الأسنان وطريقة العمل بها، وبما لا يتعارض مع مصلحة العمل وضمن أخلاقيات البحث العلمي و دون تحمل الوزارة أي أعباء أو مسئولية.

,,,وتفضلوا بقبول التحية والتقدير

محمد ابراهيم محمد السرساوي
- مدير دائرة/الإدارة العامة لتنمية القوى البشرية

التحويلات

■ محمد ابراهيم محمد السرساوي(مدير دائرة)	← ناصرالدين رافت مصطفى ابوشعبان(مدير عام بالوزارة)	إجراءاتكم بالخصوص
■ ناصرالدين رافت مصطفى ابوشعبان(مدير عام بالوزارة)	← فؤاد عبد الحليم توفيق العيسوي(وكيل وزارة مساعد)	إجراءاتكم بالخصوص
■ فؤاد عبد الحليم توفيق العيسوي(وكيل وزارة مساعد)	← اشرف محروس حمزه شراب(مدير دائرة)	لعمل اللازم

Gaza Tel. (+970) 8-2846949 Fax. (+970) 8-2826295
غزة تلفون. (+970) 8-2846949 فاكس. (+970) 8-2826295

Annex 3**:** Ethical approval from the UNRWA, Gaza Strip Field.

Al-Quds University
Jerusalem
School of Public Health

جامعة القدس
القدس
كلية الصحة العامة

التاريخ:2016/8/8

Approved
HEALTH PROGRAMME
UNRWA - GAZA

حضرة الدكتورة/غادة أبو نحلة المحترم
مدير برامج الصحة– وكالة الغوث

تحية طيبة وبعد،،،

الموضوع: مساعدة الطالب أمجد الريس

تهديكم أطيب التمنيات ونتمنى لكم دوام التقدم والإزدهار. ونرجو تكرم سيادتكم بالعلم بأن الطالب المذكور أعلاه يقوم بإجراء بحث بعنوان:

"Compliance of Dental Health Care Providers with the Infection Prevention and Control Protocol in Gaza Strip" عيادات الوكالة والكلية

كمتطلب للحصول على درجة الماجستير في الصحة العامة–مسار علم الأوبئة، وعليه نرجو التكرم بالموافقة والايعاز لمن يلزم للسماح للطالب بجمع البيانات الخاصة لبحثه، حيث تشمل عينة البحث أطباء الأسنان والممرضين العاملين بعيادة الأسنان في مراكز الرعاية الأولية التابعة لإدارتكم الموقرة.

علماً بأن المعلومات ستكون متوفرة لدى الباحث والجامعة فقط وسنطلعكم على النتائج في حينها .

و اقبلوا فائق التحية و الاحترام،،،

0599 33 2460

College of Public Health

د. بسام أبو حمد
منسق عام برامج الصحة العامة
فرع غزة

نسخة:
- الملف

Jerusalem Branch/Telefax 02-2799234
Gaza Branch/Telefax 08-2644220 -2644210
P.O. box 51000 Jerusalem

فرع القدس / تلفاكس 02-2799234
فرع غزة / تلفاكس 08-264420-2644210
ص.ب. 51000 القدس

Annex 4:

Informed consent

We understand that this research aims to study the compliance with infection prevention and control protocol among the Dental Health Care providers employees in the Primary Health Care in the Ministry of Health and UNRWA in Gaza Strip Governorates.

I understand that I was selected to participate as subject in this study and I will be given a self-administered questionnaire once which includes closed and open-ended questions as a first part of my participation in the study research and the 2nd part are checklists of the IPC protocol practicing by the participant applied for 3 times for each participant in different separated times filled and evaluated by the researcher himself and another one checklist of the physical environment of the clinic and the compliance of the IPC protocol for the instruments and materials will be completed in the same day of the data collection from the specific dental clinic also by the researcher himself**.**

I have been informed that the researcher is a postgraduate student conducting this study as a thesis in order to have a master degree in Public Health from AL Quds University**.** The estimated time for each participant to complete the questionnaire will be 25 minutes, the average time for the observing IPC practice will be 30 minutes for each person. The researcher - before leaving the dental clinics will ensure that the participants who accept to participate in the study answering all questions in the questionnaire. No risk or discomforts are subjected as a result of my participation.

This questionnaire is granted freely , the researcher illustrated that the participation in the study research is entirely voluntary, and even after agreeing to take part of the study I can refuse to answer any specific questions or decide to terminate my participation at any point. All the information that I will give will be kept confidential.

Anonymity will be kept secured by using a serial number code instead of the name.

I understand the result of this research will be given to us if we ask for it and that Dr. Amjad El-Rayyes is the person to contact if I have any question about the study or about my rights a study participant. Dr. Amjad El-Rayyes can be reached through a collect call at 0599-332460 or via e-mail : amjad_elrayyes@hotmail.com

In signing this document, I am confirming my consent to be participating in the research and to be interviewed and to evaluate my practice by the researcher.

Researcher: I confess that I read the informed consent. Researcher's signature Date

---------- / /2016

For Respondent: Do you agree with what is written above? Yes No

Annex 5:

بلاغ الموافقة

أنا أفهم أن هذا البحث يهدف إلى دراسة الامتثال لبروتوكول التحكم و الوقاية من العدوى بين العاملين رسميا مقدمي الرعاية الصحية السنية في الرعاية الصحية الأولية في وزارة الصحة و وكالة غوث و تشغيل اللاجئين الفلسطينيين UNRWA في محافظات قطاع غزة .

أفهم أنه تم اختياري للمشاركة بالموضوع في هذه الدراسة وسوف يعطى لي الاستبيان لتعبئته ذاتيا مرة واحدة والذي يتضمن أسئلة مغلقة و مفتوحة باعتبارها الجزء الأول من مشاركتي في بحث الدراسة, والجزء الثاني هو قوائم مراجعة الممارسة العملية لبروتوكول التحكم و الوقاية من العدوى من قبل المشارك , و ستكون لكل مشارك ثلاث مرات في أوقات منفصلة مختلفة و تقييمها من قبل الباحث نفسه و قائمة واحدة أخرى لبروتوكول التحكم و الوقاية من العدوى من البيئة المادية للعيادة والمواد في نفس يوم جمع البيانات من عيادة الأسنان المحددة من قبل الباحث نفسه أيضا.

لقد تم ابلاغنا أن الباحث هو طالب دراسات عليا وهذه الدراسة بمثابة أطروحة من أجل الحصول على درجة الماجستير في الصحة العامة من جامعة القدس . الوقت المقدر لكل مشارك بملء الاستبيان ستكون 25 دقيقة ، و متوسط الوقت لمراقبة ممارسة بروتوكول التحكم و الوقاية من العدوى ستكون 30 دقيقة لكل شخص .

الباحث - قبل مغادرة عيادة الأسنان يضمن أن المشاركين الذين يقبلون المشاركة في الدراسة لن يتعرضوا لأي خطر أو مضايقة نتيجة لمشاركتهم الإجابة على جميع الأسئلة في الاستبيان .

ويمنح هذا الاستبيان بحرية، وأوضح الباحث أن المشاركة في بحث الدراسة طوعية تماما ، و حتى بعد أن وافقت على المشاركة في الدراسة يمكنني رفض الإجابة عن أي أسئلة محددة أو أن أقرر إنهاء مشاركتي في أي لحظة . وستبقى جميع المعلومات التي سوف أعطيها سرية.السرية ستصان باستخدام رقم تسلسلي عوضا عن الاسم.

أوقن انه ستعطى لي نتيجة هذا البحث في اي لحظة أسأل عنها و أن الدكتور/أمجد الريس هو الشخص الذي سبتم الاتصال به إذا كان لدي أي سؤال عن الدراسة أو عن حقوقي كأحد المشاركين في الدراسة. يمكن الوصول للدكتور أمجد الريس من خلال الهاتف الخلوي 0599332460

أو عبر البريد الإلكتروني : amjad_elrayyes@hotmail.com

بتوقيعي هذه الوثيقة ،أؤكد موافقتي على المشاركة في البحث و إجراء المقابلات وتقييم ممارستي من قبل الباحث.

الباحث : أقر بأنني قرأت بلاغ الموافقة مسبقا. توقيع الباحث التاريخ

---------- / /2016

للمستجيب : هل توافق مع ما هو مكتوب أعلاه؟ □ نعم □ لا

Annex 6:

Dental Health Care Providers Questionnaire for the Compliance with IPC Protocol

1	Questionnaire Code	2	Health Center Name ……
3	District ……..	4	Health Center Telephone……

Section A. Characteristics Questions

5	Age…..years	**6**	Profession 1- Dentist Position A) dentist acting as head of department B) dentist 2-Nurse 3-Dental Hygienist 4-Dental Nurse 5-Other……	**7**	Highest degree awarded: 1-Bachelor 2-Master 3-Diploma 4-Board 5- P.H.D.
8	Place of graduation Bachelor / Diploma ..……			**9**	Type of employment: 1-Regular 2-Volunteer 3-Internship
10	Gender a) male b) female			**11**	Marital status 1-Married 2-single 3-divorced 4-widowed
12	Date of start of your employment in M.O.H. or UNRWA in years ……..				
13	Did you work in other organizations before? a-Yes b- No				
14	Total years of experience in Dental setting since graduation…….				
15	Have you been involved in the preparation of any infection prevention control protocol during your work in MOH or UNRWA? a-Yes b-No				
16	Did you receive any training courses on the IPC protocol practices ? a-Yes b-No if yes indicate the date of the last training course…… /……/……...				
17	Is this training course is part of the In-service training in your clinic in MOH or UNRWA ? a-Yes b- No c-Don't know				
18	Are you interested in a training course on the IPC protocol practices ? a-Yes b- No c-Don't know				
19	Does your basic education curriculum incorporate training about IPC protocols ? a-Yes b-No				
20	Do you have a written copy of the infection prevention control protocol in your clinic? a-Yes (seen) 1- in English b- Yes (not seen) c-No d-Don't know				

	2- in Arabic If yes answer the next question , If no skip to question **24**
21	Have you been asked to read it before starting Job? a-Yes b-No If yes answer the next question , If no skip to question **24**
22	have you been asked to sign documentation of that? a-Yes b-No
23	Availability of the protocol. a-Present in the shelf of the room where services are provided. b-Present in the drawer. c-Present in the cupboard. d-Present in other places (specify)……. e-Don't know
24	Do you have a dental supervisor who supervises your work? a-Yes b- No c-Don't know
25	do you supervise other employee in your clinic? a-Yes b-No
26	Do you have in use monitoring system about infection rate in your clinic ? a-Yes b- occasionally c- No d-Don't know if yes ,answer the next questions. If no, skip to question 32
27	Are the findings of monitoring used to improve infection rate in your clinic? a-Yes b- sometimes c- No d-Don't know
28	Has your clinic ever carried out a follow up/supervision of your practice regarding the infection prevention control procedures? a-Yes b- No c-Don't know if yes mention the date of the last follow up……../……./…….
29	If yes , what are the tools does your supervisor usually use ? a- Checklist b- Observation c- Questionnaire d- Monitoring of infection rate at the clinic. e- Reports f- Others specify…… g- None
30	did you receive any feedback after your supervisor's visit regarding your IPC practices in the clinic? a-Yes written feedback b-Yes verbal feedback c- Not at all
31	If yes, what do you do with the feedback? a-Keep it in the files without discussion. b-Discusses it with the concerned people. c- Use it in the developing improvement strategies. d-Others, specify……..
32	Have you been asked about having vaccination against infectious diseases?

	a-Yes			b-No		
33	If yes, what type of vaccination you have ? a- Hepatitis B			b- other type.		
34	**Material availability (refer to the last year)**					
Material		Availability status: 1-always 2-sometimes 3-rarely	Experiencing shortage: 1-frequently 2-sometime 3-never	**Material**	Availability status: 1-always 2-sometimes 3-rarely	Experiencing shortage: 1-frequently 2-sometime 3-never
latex Gloves				Garbage cans		
Alcohol				Autoclave		
Face mask				Dry heat oven		
Bleach				Plastic paper to wrap instrument		
Plastic bags				Lab coats		
Towel papers for dental chairs				Face shield		
Suction tubes				Apron		
Employee vaccination (Hepatitis B)				Cabinet for storage		
35	In your opinion what are the reasons for material shortage you have experienced ? a-Inadequate material in the central store. b-Management problems in ordering the material. c-Inaccurate estimation of the needed material. d-Miss-use. e-Increased load. f- Bureaucracy. g-All of them. h-Others specify…(no Shortage)……					
36	What does IPC protocol mean to you ? you may choose more than one option a-IPC protocol improve quality of health. b-Save health workers. c-Save client lives. d-Save the community. e-Don't know.					
37	Do you agree with the following statements?					

	SN	Statement action	Yes	No	Don't know
	A	IPC practices are essential for dental health care provider			
	B	IPC practices decrease the creditability at work.			
	C	Decontamination solution should be changed every other day.			

	D	Sterilization doesn't kill all microorganisms including bacterial endospores			
	E	Waste containers can be used for other purposes if they are washed with 0.5% chlorine solution.			
	F	Wrap instrument as tightly as possible before autoclaving.			
	G	The time for autoclaving unwrapped instruments is 20 minutes.			
	H	If gloves are in short supply it is acceptable not to change gloves between clients.			
	I	Glass container that contains toxic substances can be washed and rinsed and reused.			

38	Are you familiar with the concept of IPC standard precaution ? a-Yes b- No
39	If question 38 is yes ; what is the source of your knowledge of IPC protocol of cross infection ? a-university b-work shop c-conferences d-internet e-books f-university &work shop g-Don't know
40	In your opinion what does standard precaution means to you ? choose one. a- Represents a system of barrier precautions to be used by all personnel. b- They are the standards of care. c- They assume that all clients and all body fluids are contaminated all the time. d- All of them. e- Don't know.
41	What are the main components of standard precautions? choose all the applicable answers. a- Hand washing. b- Gloves use. c- Other physical barriers (including chemical processes). d- Prevention of injuries from sharps. e- Environmental cleanliness and waste- disposal. f- Instrument processing (decontamination, cleaning, high- level disinfection, sterilization. g- All of them.

Section B: Practices

42	How does the IPC protocol influence your practice at the clinic ? a-Improve practice to high extent. b-Improve practice to some extent. c-doesn't improve practice at all.
43	Do you usually assess the client medical history regarding the IPC before caring for them ? a-regularly b- sometimes c-rarely d-not at all
44	Do you document each client condition regarding infection or infectious diseases in the client file regardless to the number of visits he paid? a-Yes b- No
45	Does each patient seeking dental care treatment is requested to get his health record as starting, wither he has infectious disease or not? a-Yes b- No
46	Is the IPC protocol in use in the clinic you work at ? a-always b-sometimes c-never (if answer is c go to question 50) If the answer in the above question is never, then please indicate the reasons for not using the protocol. a.---------- b.---------- c.----------

47	If used, are they user friendly? a-Yes t high extent b-Yes to some extent c-Not at all
48	Have you noticed any obstacles in using the IPC protocol? a-Yes many b- Yes few c- Not at all
49	What are the main obstacles in using the IPC protocol? Choose all the applicable answers. a-Insufficient knowledge b-Insufficient training c-Poor follow up from the clinic d-Work overload e-Lack of time f-all of the above g-Others (please specify)……
50	Do you have private clinic? a-Yes b- No
51	Do you practice the IPC protocol practices in your private clinic ? a-Yes always b- Sometimes c- Never (if the answer is C, mention reasons)
52	What is your opinion about DHCP compliance with the IPC protocol in M.O.H.& UNRWA? a-Excellent b-Very good c-Good d-Bad
53	Does your professional position give you the possibility of contributing in the updating of the IPC protocol? a-Yes b- No c- Don't know

Section C: Your comments.

54	Is the IPC protocol suitable for dental clinics or need a modification to be suitable for dental practice ? a-Suitable b-Need modification
55	In your opinion what are the most important action needed to increase the dentist DHCP compliance with the IPC protocol? a-training courses b-monthly assessment c-bounces & punishment d-availability of enough material e- All of the above f-others specify……
56	Is there assigned person for ensuring staff compliance in your work place? a-Yes b- No c- Don't know If answer is a please specify.----------
57	Is there a list of daily procedures required to insure IPC compliance in clinic? a-Yes b- No
58	Who check daily compliance with it ? a- Head of the clinic b- Head of nurses c- No one
59	Are there a " needle stick" protocol and post exposure program? a-Yes b-No
60	Is there a mechanism to document the exposure incident? a-Yes b-No
61	Do DHCP perform hand hygiene before and/or after treating patients ? a-Yes b-No

62	Are alcohol hand rub available? a-Yes b-No
63	Are the staff properly trained in the use of alcohol hand rub products ? a-Yes b-No
64	Are there a list of what surfaces will be cleaned, disinfected or barrier protected and the process and products to be used ? a-Yes b-No
65	If chemical disinfectants are to be used, is there a protocol for how they are managed, stored and disposed ? a-Yes b-No

Annex 7:

Infection Prevention and Control
Specific Procedures Checklist

Health facility name:…… Observer name: ……..
Date: / / Number DHCP: Dentist No……Assistants No……..
Dental Units…… Average No. Of Daily Patients…….

IP 15	The following items represent standards practices of IPC according to protocols or guidelines	Observation
1	Hand washing: Hands are washed when indicated. They are washed with soap under running water, and hands are dried with a clean towel, or tissue paper.	☐ Y ☐ N ☐ NA
2	Wearing gloves: Gloves are worn when dealing with blood or other body fluids.	☐ Y ☐ N ☐ NA
3	Lab coats are worn by DHCP at the clinic on their duty.	☐ ☐ N ☐
4	Facemask is worn by the dentist when caring for the clients.	☐ ☐ N ☐
5	Dental mirror which is used for dental treatment is changed between every patient.	☐ Y ☐ N ☐ NA
6	Antiseptics and disinfectants:Disinfection is used only for processing items for reuse. Antiseptic and disinfectant solutions are handled in a manner that reduces risk of contamination.	☐ Y ☐ N ☐ NA
7	Use of sharp boxes (safety box) : Needles are not recapped, cut, bent or removed from syringes and are effectively disposed of in the puncture resistant containers. Sharp boxes are available whenever sharps are used.	☐ Y ☐ N ☐ NA
8	Decontamination of instruments: Chlorine 0.5% is used to decontaminate them after their use. They are cleaned using a soft brush and detergent. They are rinsed with water before sterilization or high level disinfection, then dry before sterilization.	☐ Y ☐ N ☐ NA
9	Sterilization: For steam and dry heat sterilization temperature, pressure and time are monitored. Items are properly packed and dated for one week, and for dry heat every day ,so that steam reaches all surfaces.	☐ Y ☐ N ☐ NA
10	Housekeeping: The non- client areas are free of dust, dirt and organic waste. The client areas are cleaned with disinfectant solutions. Housekeeping equipment like mops, buckets and clothes, are kept clean and dry, and stored properly.	☐ Y ☐ N ☐ NA
11	Disposal of waste: General waste and medical waste are separated. Medical waste is burned or buried properly. Liquid medical waste is poured down into drain. Containers used for medical waste are properly cleaned with disinfectants.	☐ Y ☐ N ☐ NA

*** Please document the key observations on practices in the supervisory report form with in depth analysis whenever needed and suggestions for solutions and next step**

Annex 8:

Infection Prevention and Control
Systems and Supplies Checklist

Health Facility Name:…… Observer name: …… Date: / /

IS 16	The following items represent standards practices of IPC according to protocols or guidelines	Observation
1	Cleanliness of equipment: Surfaces of examination couches, of dressing trolleys, of equipment and supplies are dry and clean in all rooms.	☐ Y ☐ N ☐ NA
2	Paper Sheets: Paper sheets are available on all examination couches and replaced after each patient.	☐ Y ☐ N ☐ NA
3	Supplies for hand washing: Supplies or items like a water source, a sink, soap bars or liquid soap, towels or tissue paper are available and clearly in use.	☐ Y ☐ N ☐ NA
4	Alcohol swabs: Antibacterial wipes and/or alcohol swabs are available in all rooms where examinations or other invasive procedures occur.	☐ Y ☐ N ☐ NA
5	Supplies for decontamination: Supplies like plastic basins, 0.5% chlorine solution, cleaning brushes and utility gloves are available for proper instrument decontamination and cleaning.	☐ Y ☐ N ☐ NA
6	Aseptic dressing supplies: Supplies for implementing aseptic dressing techniques are available (e.g. sterile dressing sets, instruments with expiry dates, antiseptic solutions, sterile wound coverings and sterile gloves.	☐ Y ☐ N ☐ NA
7	Functional sterilization system: the autoclave is functioning, it is clean, it is not crowded with items; regulators for temperature, moisture and time are not defect and indicator tape is functioning. And monitoring by the DHCP.	☐ Y ☐ N ☐ NA
8	Waste disposal system: the system is available and operates Properly. E.g. trash bins are lined with plastic bags that are available in sufficient quantities, they don't contain sharps or fluids.	☐ Y ☐ N ☐ NA
9	For waste disposal system : do the trash bags are colored according to their risk and the international standards?	☐ Y ☐ N ☐ NA
10	Sharp boxes (safety box): in every room or area where sharps are used there are sharp boxes. The recommended fullness of two thirds of their capacity is not exceeded and full sharp boxes are kept in a safe place until being incinerated.	☐ Y ☐ N ☐ NA
11	Toilets of the facility are clean and free from rubbish. The area surrounding the facility is also clean and free from rubbish or waste.	☐ Y ☐ N ☐ NA

*** Please document the key observations on practices in the supervisory report form with in depth analysis whenever needed and suggestions for solutions and next steps**

Annex 9:

.

List of the validating experts who validated the self-administered questionnaire, the observation checklist of IPC practice and checklist of instrument and supplies in the dental units.

- **Prof. Dr. Yehia Abed.,** PhD. Epidemiology, School of Public Health, Al-Quds University.
- **Dr. Rami Al-Ja'edi.,** M.Sc. Oral Pathology, Assistant Prof. Oral and Maxillofacial Surgery, Al- Azhar University.
- **Dr. Mahood Ayyad.,** B.D.S., Former manager of Dental Department at M.O.H.
- **Dr. Musa Al-Kahlout.,** B.D.S., Former Deputy manager of Dental Department at M.O.H.
- **Dr. Hanan Diab.,** M.Sc., Senior medical officer of Dental Department at UNRWA.
- **Dr. Amal Al-Batsh.,** M.Sc., Head of Khan Younis Al-Moaskar dental clinic at UNRWA.
- **Prof. Dr. Bassam Abu Hamad.,** PhD. Public Health, executive coordinator of School of Public Health , Gaza branch, Al-Quds University.
- **Assistant Prof. Dr. Khetam Abu Hamad.,** School of Public Health**,** Al-Quds University**.**
- **Dr. Zuhair Barzaq.,** B.D.S., Head of Dental Department at Palestinian Red Crescent Society-Gaza Strip**.**
- **Mr. Kamel Al-Asmar.,** M.Sc., Head of Nursing Sector at Dental Department at M.O.H.

ملخص الدراسة

هذه الدراسة تحاول تقييم مستوى التزام العاملين بمهنة طب الفم و الاسنان من مقدمي الخدمة في عيادات الاسنان بدائرة الرعاية الاولية في كل من وزارة الصحة الفلسطينية و وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين (اونروا) ، حسب معايير برنامج السيطرة و مكافحة العدوى في عيادات الاسنان التابعة للرعاية الاولية في وزارة الصحة الفلسطينية و و وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين .

اعداد : امجد غسان الريس

اشراف: د. لميس ابو حالوب

أهداف الدراسة:

تم استحداث برتوكول فلسطيني للسيطرة على ومكافحة العدوى مناسب للوضع الصحي الفلسطيني و مستندا على بروتوكولات و أدلة صحية من مؤسسات دولية ، لكن بالرغم من وجود رقابة داخلية في مراكز الرعاية الاولية في وزارة الصحة و وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين (اونروا) الا انه منذ تاسيس هذا البروتوكول على ارض الواقع لم يتم تقييم استخدامه علما انه من المفترض ان يتم تقييمه كل سنتين منذ تاريخ اعلانه عام 2004 ،كما انه هناك دراسة علمية واحدة فقط اجريت للعاملين في وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين (اونروا) بهدف تقييم الوضع الصحي بالوكالة و كانت عام 2010م.

هذه الدراسة تهدف لتقييم مدى التزام الموظفين الدائمين من مقدمي الرعاية الصحية في الرعاية الاولية في عيادات الاسنان في كل من وزارة الصحة الفلسطينية و وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين (اونروا) بهذا البروتوكول في محافظات قطاع غزة ، و تقييم مدى المعرفة و الالتزام بمعايير الجودة و مكافحة العدوى لمقدمي الخدمة الصحية في عيادات الاسنان بالرعاية الاولية. و ايضا مقارنة مستوى توفر المواد الطبية الازمة لتقديم خدمة صحية متوافقة مع البروتوكول الفلسطيني بين كل من وزارة الصحة الفلسطينية و وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين ، وتقييم برنامج المتابعة الداخلية والمراقبة على جودة العمل من قبل كل من وزارة الصحة و وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين بالنسبة للعاملين في مجال تقديم الخدمات الصحية في عيادات الاسنان ، واقامة الدورات و ورش العمل الازمة لاستنهاض الهمم و تحفيز العلم و ممارسته على ارض الواقع ،

و توضيح العوامل التي تؤثر على التزام العاملين في تقديم الخدمة الصحية في عيادات الرعاية الاولية السنية على تطبيق البروتوكول الفلسطيني الخاص بالسيطرة على و مكافحة العدوى والتي ستساهم بالحد من انتشار العدوى مما يقلل من نسبة انتشار الامراض المعدية و الوفيات .

منهجية الدراسة:

هذه دراسة وصفية نظرية تحليلية لعلم الاوبئة في كلية الصحة العامة في جامعة القدس ،تم جمع البيانات عن طريق الاستبيان الموزعة على الموظفين الدائمين من مقدمي الرعاية الصحية السنية في مراكز الرعاية الاولية في كل من وزارة الصحة الفلسطينية و وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين (اونروا) و ايضا باستخدام قائمة التدقيق، وقد شملت الدراسة جميع مقدمي الخدمة الصحية في عيادات الاسنان في مراكز الرعاية الاولية في كل من وزارة الصحة الفلسطينية و وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين (اونروا) في محافظات قطاع غزة ، وكان عددهم (137) موظف دائم والذين قاموا بتعبئة الاستبيان ، بمعدل استجابة 100% و قد تم ايضا استعمال قائمة التدقيق من قبل الباحث الذي قام بملاحظة المشاركين في الدراسة اثناء تقديمهم الرعاية الصحية السنية المطلوبة ، كما قام بتعبئة قائمة مطابقة للبروتوكول الفلسطيني تقيم توفر الأدوات و المواد الازمة في العيادات السنية لتقديم خدمة طبية.

نتائج الدراسة:

اظهرت الدراسة 59.9% من المشاركين كانوا ذكورا و 40.1% من الاناث ، 62.1% من خريجي فلسطين و الدول العربية، 97.8% حاصلين على تطعيم التهاب الكبد الوبائي نوع B ، 60.6% حاصلين على دورات لمكافحة العدوى و مستوى التزام مقدمي خدمة طب الفم و الأسنان بتطبيق معايير برنامج السيطرة ومكافحة العدوى في وكالة الغوث أعلى من وزارة الصحة الفلسطينية. 29.1% لديهم نسخة عن البروتوكول كما ان الدراسة اظهرت ان 21.2 % من العاملين لديهم نظام مراقبة لمعدل العدوى بالعيادة ، كما ان نسبة توفر المواد الازمة لممارسة منع انتشار العدوى تراوحت بين 100% في بعض المواد و78.1 % بالنسبة لقناع الفم و62.5% بالنسبة لمواد التنظيف bleach و 13.9% بالنسبة لواقي الوجه . وقد اجمع 47.4% من المشاركين ان سبب نقص المواد هو عدم توفرها بالمخازن المركزية. كما ان 78.3% لم يقوموا بغسل ايديهم بعد نزع القفازات الطبية و ان 99.3% كانوا يلبسون القفازات الطبية و قاموا بتغييرها ، وان 45.3% كانوا يلبسون قناع الفم و 96.4% قاموا بإزالة التلوث عن الادوات بعد استخدامها بمحلول الكلور تركيزه 0.5% و فرشاة مناسبة. كما ان 75.9% على معرفة بأهمية معايير الوقاية و مكافحة العدوى للمجتمع. كما ان

98.5% قاموا بتعريف برنامج السيطرة ومكافحة و العدوى بشكل يؤكد على درايتهم بالموضوع. 83.9% من المشاركين بالدراسة قرروا ان بروتوكول السيطرة ومكافحة العدوى اصبح قديما و يحتاج لتطوير كما ان البروتوكول عام و ليس متخصص بالرعاية السنية و منع انتشار العدوى . بالإجماع 100.0 % اكدوا انه لا يوجد بروتوكول خاص بالحوادث و الاصابات الطبية مثل غزة الابرة , وهو ما يستدعي مناقشة هذا الموضوع و ايلاؤه الاهتمام الازم.

اوضحت الدراسة انه لا توجد فروق ذات دلالة احصائية بين الالتزام بتطبيق مكافحة العدوى و المتغيرات الاجتماعية و الديموغرافية.

هذا بشكل عام لكن الدراسة ايضا تشمل مقارنة بين كل من الرعاية الصحية الاولية في وزارة الصحة الفلسطينية و وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين (اونروا) ، حيث انه هناك بعض الفروق ذات الدلالات الاحصائية حيث ان 72.5 % من العاملين في الاونروا حاصلين على دورات بشان مكافحة العدوى مقابل 55.7% في وزارة الصحة ، و ايضا 90.0% من العاملين في وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين (اونروا) لديهم نسخة عن البروتوكول مقابل 4.1 % في وزارة الصحة الفلسطينية ، 67.5% من العاملين في وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين (اونروا) لديهم نظام مراقبة لمعدل العدوى بالعيادة مقابل 2.1% في وزارة الصحة الفلسطينية ، كما ان نسبة توفر المواد هي 100.0% في وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين (اونروا) بينما 67.0% من العاملين بوزارة الصحة يؤكدون ان نقص المواد في الوزارة ناتج عن عدم توفرها في المخازن المركزية التابعة لدائرة الصيدلة بوزارة الصحة ، وايضا 5.0% من العاملين في وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين (اونروا) يقوموا بغسل ايديهم عند اللزوم مقابل 28.5% عند العاملين بوزارة الصحة. بينما 55.0% من العاملين في وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين (اونروا) يلبسون قناع الفم مقابل 41.2 % من العاملين بوزارة الصحة الفلسطينية يلبسون قناع الفم. و ايضا 100.0% من موظفي الاونروا قاموا بإزالة التلوث عن الادوات بعد استخدامها بمحلول الكلور تركيزه 0.5 % و فرشاة مناسبة مقابل 94.8% من العاملين بوزارة الصحة الفلسطينية قاموا بإزالة التلوث عن الادوات بعد استخدامها بمحلول السايدكس. كما ان 97.5% من العاملين في وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين (اونروا)على معرفة بأهمية معايير الوقاية و مكافحة العدوى للمجتمع مقابل 67.0% من العاملين بوزارة الصحة الفلسطينية ، 100.0% قاموا بتعريف برنامج السيطرة ومكافحة و العدوى بشكل يؤكد على درايتهم بالموضوع من الاونروا مقابل 97.9% من موظفي وزارة الصحة الفلسطينية، 75.0 % من المشاركين بالدراسة من موظفي الاونروا قرروا ان

بروتوكول السيطرة ومكافحة العدوى اصبح قديما و يحتاج لتطوير كما ان البروتوكول عام و ليس متخصص بالرعاية.

التوصيات :

توصي هذه الدراسة بمشاركة مقدمي الخدمة في تطوير بروتوكول السيطرة و مكافحة العدوى الفلسطيني ، و تعزيز مبدا المراقبة و الرصد لانتشار العدوى في العيادات، و اقامة الدورات و ورش العمل لمقدمي الخدمات والرعاية الصحية في عيادات الاسنان في كل من وكالة الامم المتحدة لإغاثة و تشغيل اللاجئين (اونروا) و وزارة الصحة الفلسطينية وايلاء الاهتمام بتوفير المواد الازمة و سد النقص فيها وخاصة في وزارة الصحة الفلسطينية. واجراء هذه الدراسة في العيادات و مراكز طب الاسنان الخاصة لتقييم التزام مقدمي الرعاية الصحية السنية في عيادات ومراكز طب الاسنان الخاصة ببروتوكول السيطرة ومكافحة العدوى في قطاع غزة.